A TWO-STUDY INVESTIGATION OF THE HOME LITERACY ENVIRONMENT: EXAMINATION OF LATINO CHILDREN'S LITERACY GROWTH AND A CRITICAL REVIEW OF ASSESSMENT PRACTICES IN THE HOME LITERACY ENVIRONMENT

A Dissertation

by

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ABSTRACT

This two-study examination was designed to explore aspects of the home literacy environment (HLE) in relation to young English Language Learners' (ELLs) Spanish literacy development and to critically examine the approaches previous studies employed to define and assess the HLE. The first study included (n = 158) Latino ELLs and their families and investigated whether their HLEs impacted their Spanish literacy development from prekindergarten to first grade. Growth curve analyses of the reading performance of children assigned to one of three validated HLE profiles revealed significant increases in letter recognition and phonemic awareness skills across all three groups. However, children's HLE classification did not contribute to differences in ELL's literacy growth over time. Further examination of the starting points and growth rates of ELL children's literacy skills revealed greater growth rates for children assigned to Profile 2 in their letter recognition skills. The second study was a critical review to identify dimensions and standardized tests on the HLE. Key findings included (a) the majority of prior studies used indirect measures of parent reports to evaluate the HLE, (b) most prior studies focused on the quality of HLE practices in relation to children's language and literacy outcomes, and (c) the majority of HLE studies have focused on Caucasian children between the ages of 3 and 7 years. Collectively, findings from this dissertation suggest that future studies should employ more direct assessments of the HLE that incorporate relevant dimensions identified by prior research. Moreover, given the growing number of young Hispanic ELL children entering US schools, future studies of the HLE should involve this population's families.

DEDICATION

My dissertation is dedicated to my amazing family. Without you three, life would be meaningless.

John, we finally completed graduate school! It was quite a journey filled with ups and downs. We were blessed with beautiful twin girls, moved across two states in two years, and finally found a place we can truly call home. While it was crazy at times, I would not have wanted it any other way. Your unconditional love and support helped me to accomplish more than I ever imagined. I am forever grateful - thank you!

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

The home literacy environment (HLE) is often described as the setting in which children acquire language and literacy skills through parent-child interactions and conversations (Bracken & Fischel, 2008; Hammer, Micco, & Wagstaff, 2003; Hart & Risley, 1995; Payne, Angell, & Whitehurst, 1994; Weigel, Martin, & Bennett, 2005). Previous research on the HLE emphasizes the important role of the parents in providing frequent, high-quality language and literacy interactions to support children's literacy development (National Reading Panel, 2000; Sénéchal & Lefevre, 2002; Whitehurst & Lonigan, 1998). While the contribution of the HLE is well documented in promoting children's literacy skills among English-speaking families, much less known about the contribution of the HLE to literacy development of diverse learners, particularly children who are learning English in conjunction with their primary/native language.

The quality of HLEs among families from more diverse homes has often been assumed to be uniformly low in relation to children from homes with more resources (Castro, Mendez, Garcia, & Westburg, 2012; Phillips & Lonigan, 2009). While literacy practices have been described as homogenous among economically disadvantaged families, research has shown that variations exist within this category of families. Using Latent Class Analysis (LCA), Davis and colleagues (2016) identified three distinct profiles of the HLE. The first profile (low beliefs and low practices; LBLP; Profile 1) was characterized by families who espouse low beliefs in children's active participation during shared reading experiences and the practical knowledge gained from these

experiences provided in the home. These families reported the greatest number of children in the home, the fewest number of literacy materials, and engaging less in literacy interactions in the home when compared to other identified profiles on the HLE. The second profile (moderate beliefs moderate practices; MBMP; Profile 2) reflected the greatest percentage of families who endorsed direct shared reading instruction and was characterized by moderate levels of direct literacy practices in the home. The majority of families with HLE Profile 2 had fewer children in the home, more literacy materials, and read to their children more frequently than families assigned to Profile 1. Families that fit the third profile (high beliefs and high practices; HBHP; Profile 3) reported high levels of shared-reading beliefs and literacy practices. The majority of these families also reported having fewer children in the home and relatively more literacy resources. This group was also characterized by higher levels of literacy engagement with their children than families that fell within Profiles 1 or 2. These three distinct profiles represent a new conceptualization of literacy practices in demographic category once thought to be homogenous. While the prior study (Davis et al., 2016) described these categories with reference the HLE, the current study seeks to examine the impact of previously identified HLE profiles in a sample of Latino, Mexican-American families' on children's literacy development over time.

Research indicates a positive relationship between family literacy practices in the home and children's later achievement skills. Despite initial evidence supporting the utility of these HLE profiles, significant variability exists within prior research regarding the relevant dimensions, contextual variables, and potential standardized measures for

capturing the HLE. Prior research has underscored some critical dimensions of children's early literacy experiences (Roberts, Jergens, & Burchinal, 2005; Sénéchal & LeFevre, 2002; Payne et al., 1994; Whitehurst & Lonigan, 1998). Without consensus regarding all key components of the HLE, the degree to which critical characteristics are reflected in HLE assessment outcomes and subsequent potential implications remain unclear (Baroody & Diamond, 2012).

This purpose of the current study is two-fold. First, we examine variations in HLE practices for families of young English Language Learners' (ELLs) and its impact on children's Spanish literacy development. To examine whether differences documented in reports on the HLE among these Mexican- American, Spanish-speaking families' impact children's literacy outcomes, the following research questions were addressed:

1. Do growth patterns of children's alphabet knowledge and phonological skills vary as a function of their HLE profile? We hypothesized children assigned to Profile 1 (LBLP) would demonstrate greater significantly different growth patterns than those assigned to Profile 2 (MBMP) or Profile 3 (HBHP).
2. Are children's initial skill levels (i.e. intercepts) at the beginning of pre-K associated with their HLE profile? We hypothesized that children assigned to HLE Profiles 2 and 3 (e.g. MBMP; HBHP) would demonstrate greater initial skill levels than children assigned to Profile 1 (e.g. LBLP).
3. Are children's growth rates (i.e. slope) in Spanish emergent literacy skills associated with assigned HLE profile across prekindergarten, kindergarten,

and first grade? We hypothesized children assigned to Profile 1 (e.g. LBLP) would demonstrate the steepest growth rates across emergent literacy skill areas after they begin receiving instruction in Spanish emergent literacy areas.

Next, we examined measurement aspects from previous studies that defined and assessed the HLE. A critical review was conducted to identify studies that used standardized measures on the HLE. The goal and scope of the critical review was to (a) identify and evaluate published research studies that met our screening and inclusion criteria, (b) identify standardized assessments that were used to examine the HLE, (c) identify the various dimensions and contextual variables prior studies have reported on the HLE, and (d) identify gaps existing in the literature and future research needs. The following questions were addressed:

1. What trends are most often reported in study and participant characteristics among published studies of the HLE?
2. Which standardized tests, constructs, and relevant psychometric properties are most often reported on standardized measures of the HLE?
3. Which outcomes and implications are most often reported from measures of the HLE in research?

CHAPTER II

THE HOME LITERACY ENVIRONMENT AND EMERGENT LITERACY

Parent-child interactions in the home are critical in promoting young children's literacy skills (Sénéchal & Lefevre, 2002; Whitehurst & Lonigan, 1998). Specifically, these interactions support children's development of emergent literacy and school readiness skills (Hood, Conlon, & Andrews, 2008; Payne et al., 1994; Sénéchal & Lefevre, 2002, Snow, Burns, & Griffin, 1998). Measurement of the quality of parent-child interactions surrounding literacy skills, or the HLE, have been found to predict children's later school readiness skills. Previous research on the HLE of English-speaking families documents the important role of parents in providing frequent, high-quality language and literacy interactions in the home to support children's literacy development (National Reading Panel, 2000; Sénéchal & Lefevre, 2002; Whitehurst & Lonigan, 1998).

While the contribution of the HLE is well documented in promoting English-speaking children's literacy skills, much less is known about its contribution to the literacy development of diverse learners in diverse cultural settings (Baker, 2014a; Castro et al., 2012; Phillips & Lonigan, 2009). Children entering schools from more diverse homes often demonstrate language and literacy skills well below their same aged peers (Castro et al., 2012). It is often thought that children from diverse backgrounds are afforded a homogeneous, low-quality HLE (Castro et al., 2012; Phillips & Lonigan, 2009). Recent research by Davis and colleagues (2016) identified variations in HLE practices in a sample of low SES, Mexican-American families. Three distinct profiles of

the HLE emerged from a LCA examining Latino parents' literacy beliefs and practices. While Davis et al. (2016) uncovered variations in HLE practices within a sample of low-SES families, this research only described differences in HLE and did not link these differences to salient outcomes. The current research seeks to identify how previously identified HLE profiles from Latino families' impact children's literacy development over time.

Differences documented in children's school readiness and later achievement skills are strongly linked to the quality of the learning experiences children encounter in the home (Payne et al., 1994; Weigel et al., 2005). The quality of the HLE is often measured by parent reports on their literacy beliefs and practices (DeBaryshe & Binder, 1994), the frequency of parent-child literacy interactions occurring in the home, and the number of literacy materials available in the home (Payne et al., 1994; Phillips & Lonigan, 2009). However, myriad of factors related to familial beliefs and activities also contribute to qualitative differences reported on the HLE.

Sociocultural factors related to the HLE include parent reports of income, education attainment, and the language used in the home. These factors are thought to contribute to the strengths and weakness measured on the HLE (DeBaryshe & Binder, 1994; Stephenson, Parrila, Georgiou, & Kirby, 2008; Farver, Xu, Eppe, & Lonigan, 2006; Weigel, Martin, & Bennett, 2006). Children with limited exposure to literacy-rich interactions in the home may face social-risk factors. Exposure to these potential risk factors underscore the importance of the mother-child language relationship (Farver et al., 2006; Weigel et al., 2005).

Social risks such as poverty often impede a family's access to literacy resources and can influence parent's beliefs, practices, and attitudes around literacy (DeBaryshe & Binder, 1994; Stephenson et al., 2008; Farver et al., 2006). Parents living in poverty many times report having fewer literacy materials and providing fewer literacy opportunities to their children. In addition, these parents report lower educational attainment levels and use of a language other than English in the home when compared to more economically advantaged parents (Stephenson et al., 2008).

In particular, greater maternal educational levels are repeatedly associated in research with greater outcomes on measures of children's school readiness and literacy skills (Foster, Lambert, Abbott-Shim, McCarty, & Franze, 2005; Weigel et al., 2006). In associated findings, Mothers who report more sophisticated literacy beliefs and practices more often report greater incomes and educational attainment (Weigel et al., 2006). Despite the documented importance of the HLE on monolingual English children's language and literacy development, much work remains in understanding the link between the HLE and children's school readiness skills, especially among diverse populations.

Spanish-speaking, Latino children and their families differ in meaningful ways (e.g., beliefs, values, priorities) from mainstream families (Castro et al., 2012). Latino families possess strengths and weaknesses in their provision of language and literacy supports. Compared to more economically advantaged mothers, Latino mothers often report lower incomes, less educational attainment, and the use of a language other than

English- all of which can be risk factors for young Latino children (Payne et al., 1994; Phillips & Lonigan, 2009; Sénéchal & Lefevre, 2002).

Latino children often enter school from economically disadvantaged homes in which a language other than English is spoken (Castro et al., 2012). For many Latino children entering U.S. schools, the origins of achievement difficulties are readily evident in preschool (Lonigan, Farver, Nakamoto, & Eppe, 2013). For example, the differences documented in Latino children's emergent literacy abilities at prekindergarten are often associated with parent's language dominance (e.g., Spanish versus English). Latino parents who report speaking both English and Spanish in the home more often have children who demonstrate greater outcomes initially on measures of literacy than children from primarily Spanish-speaking homes (Lonigan et al., 2013).

English Language Learner (ELL) generally refers to children who enter U.S. schools from homes in which a language other than English is spoken (U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2013). ELL children currently make up 9 % of the U.S. school population (U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2013). Hispanic children represent 14% of the ELL children in U.S. schools (Brown, 2014) and the majority of whom are of Mexican descent (52.4%). Many of these children's families report living in poverty (35%) and speaking predominantly Spanish in the home (60.2%; Brown, 2014). Combined, these sociocultural influences may function as risk factors for ELL children of Mexican decent acquiring adequate literacy skills in U.S. schools.

The emergent literacy and school readiness skills of Spanish-speaking, ELL children many times fall well below their same-aged English-speaking peers (Hammer, Jia & Uckihoshi, 2011; Lonigan et al., 2013). Key precursors to conventional reading, defined as emergent literacy skills, develop along a continuum early on in children's lives (Lonigan, 2006; Lonigan, Burgess, & Anthony, 2000). Proximal to the HLE, children begin acquiring both alphabet knowledge and phonological awareness skills early on through parent- child conversations and literacy interactions in the home.

Alphabet knowledge is defined as the understanding and recognition of differences in the letter shapes of an alphabet (Lonigan, 2006). Phonological awareness is defined as the manipulation of the letter sound units comprising a word (Honig, Diamond, Gutlohn & Cole, 2013). Acquiring these skills early on often prime children to break the alphabetic code of a language and demonstrate adequate literacy skills in later grades (Lonigan et al., 2000). However, differences in contextual factors related to the HLE are often overlooked in research comparing the literacy abilities of more diverse children to English-speaking children.

ELL children entering U.S. schools from language minority homes often have limited exposure to English (Hoff, 2013). ELL children exposed to less English in the home often continue to demonstrate less growth in their literacy skills compared to children exposed to English and Spanish in the home (Hammer & Micco, 2006; Lonigan et al., 2013). These findings suggest children entering U.S. schools from primarily Spanish-speaking homes may be at a disadvantage, with slower rates of development expected.

Parallel relationships found between the HLE and early achievement for Latino, ELL children are reflective of the HLE research and its contribution to monolingual children's literacy development. However, not enough is known about how contextual factors related to the HLE of diverse families impact minority children's literacy skill development over time (Farver et al., 2006; Lonigan et al., 2013; Mancilla-Martinez & Lesaux, 2011; Páez Tabors, & Lopez, 2007; Rodriguez & Tamis-LeMonda, 2011). In this study, we aim to examine how variations documented in three distinct profiles on the HLE of parents literacy beliefs and practices impacts the literacy development of Mexican-American children entering U.S. schools from Spanish-speaking, low SES homes from prekindergarten through first grade.

In summary, children's literacy skills develop within the context of a HLE. The HLE provides children with their first exposure to the rudimentary building blocks of later reading. Despite the potential of the HLE in promoting children's literacy development, many children encounter a less optimal HLE. One group of at-risk children are children growing up in low-SES, Spanish-speaking homes in the United States. These homes are characterized by strengths and weakness in the language and literacy interactions provided to children. This study follows the previously identified sample of low SES, Latino children of Mexican -American decent assigned to three distinct HLE profiles. By examining these ELL children's literacy growth over time on key literacy skills, we attempt to understand the impact of varying HLE profiles on ELL children's letter recognition and phonemic awareness skills in Spanish across critical years in their literacy development.

Present Study

The present study examines longitudinal growth of ELL children's phonological awareness and alphabet knowledge skills in Spanish across three a priori HLE profiles identified in a LCA (Davis et al., 2016). Due to its relationship to English, Spanish early literacy skills were examined in this study. The rational for studying only Spanish skills lies in research showing a link between development of ELL children's Spanish literacy skills to support their later English literacy skills and promote cross-linguistic transfer of the acquired skills (Metsala & Walley, 1998).

The Latino children (n = 158) included in this study were part of a larger study examining the effects of a shared reading intervention on language and literacy outcomes. Previous research by Davis and colleagues (2016) examined parent reports on the HLE from Latino families' of Mexican-American decent living in extreme poverty. Using LCA, they identified three distinct and externally validated HLE profiles on parent reports of their literacy beliefs and practices occurring in the home.

The first profile (low Beliefs low Practices (LBLP); Profile 1) was characterized by families who espouse low beliefs in children's active participation during shared reading experiences and the practical knowledge gained from these experiences provided in the home. These families reported the greatest number of children in the home, the fewest number of literacy materials, and engaging less in literacy interactions in the home when compared to other identified profiles on the HLE. The second profile (moderate Beliefs moderate Practices (MBMP); Profile 2) reflected the greatest percentage of families who endorsed direct shared reading instruction and reported

providing moderate levels of direct literacy practices in the home. A greater percentage of these families reported having fewer children in the home, more literacy materials, and reading to their children more frequently than families assigned to Profile 1. Families that fit the third profile (high Beliefs high Practices (HBHP); Profile 3) reported high levels of shared-reading beliefs and literacy practices. More families reported having fewer children in the home, a greater number of literacy resources, and engaging more often in literacy practices than families assigned to Profiles 1 or 2. Families in Profile 3 also reported reading to their children in English more often than parents in Profiles 1 or 2.

By examining differences in the patterns of growth in ELL children's literacy skills in prekindergarten, kindergarten, and first grade the current study will help to define factors related to the HLE and the effects these factors have on ELL children's long-term literacy outcomes. Differences in skill performance over HLE type are hypothesized at both the starting points (i.e. intercept) and growth rates (i.e. slopes) of ELL children's Spanish emergent literacy skill development as a function of previously identified subtypes of the HLE. To examine whether differences exist among Mexican-American, Spanish-speaking children's language and literacy outcomes considering assignment to profiles on the HLE, the following research questions were addressed:

1. Do growth patterns of children's alphabet knowledge and phonological skills vary as a function of their HLE profile? We hypothesized children assigned to Profile 1 (LBLP) would demonstrate greater significantly different growth patterns than those assigned to Profile 2 (MBMP) or Profile 3 (HBHP).

2. Are children's initial skill levels (i.e. intercepts) at the beginning of pre-K associated with their HLE profile? We hypothesized that children assigned to HLE Profiles 2 and 3 (e.g. MBMP; HBHP) would demonstrate greater initial skill levels than children assigned to Profile 1 (e.g. LBLP).
3. Are children's growth rates (i.e. slope) in Spanish emergent literacy skills associated with assigned HLE profile across prekindergarten, kindergarten, and first grade? We hypothesized children assigned to Profile 1 (e.g. LBLP) would demonstrate the steepest growth rates across emergent literacy skill areas after they begin receiving instruction in Spanish emergent literacy areas.

Method

Settings and Participants

Data for the current study were collected as part of a larger randomized control trial (RCT) examining the effects of a shared-book reading intervention on children's vocabulary. Participants in this study were those in the first year RCT which occurred October 2011 through May 2012. Recruitment of the study participants occurred in two South Texas school districts serving primarily low SES, Spanish-speaking children of Mexican-American decent. Families across both districts were comprised of children from mostly Hispanic, Mexican-American families (M = 99.0%; M = 100%) with most families, 95.3% and 87.3%, respectively, qualifying for free or reduced lunch. The majority of these families reported speaking only Spanish (77.2%) in the home with 81.5% of these families completing the surveys and questionnaires in Spanish.

Prekindergarten teachers provided instruction in dual language classrooms in the two districts were recruited and consented to participation in the shared book reading randomized control trial (RCT). Six children from each classroom (e.g. 3 girls; 3 boys) whose parents consented were selected for participation and assessed using a battery of oral language and literacy measures. Children who scored below the 30th percentile (at risk status) on the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4; Dunn & Dunn, 2007) were selected for participation in the larger RCT. Children assigned to dual language classrooms in prekindergarten continued to receive instruction in both English and Spanish during through first grade. Data collected most often reflected outcomes on children's emergent literacy skills in Spanish.

In this study, archival data provided by participating school districts on children's Spanish literacy skills during prekindergarten, kindergarten, and first grade were used to examine children's literacy development over time. Each child was assessed by his or her teacher at the beginning, middle, and end of each academic year. Beginning of the year (BOY) assessments occurred six weeks after the beginning of school in prekindergarten and kindergarten. First graders were assessed after the first two weeks of school. Middle of the year (MOY) assessments occurred in the middle of January and end of year assessments (EOY) took place in the middle of April across all three grade levels. All assessments were administered by teachers trained in assessment practices of each test.

DataCollection

Variations in the HLE beliefs and practices were confirmed in a low, SES sample of Latino mothers reporting Mexican decent (Davis et al., 2016). The literacy beliefs and practices of each caregiver were examined using the *Parent Reading Belief Inventory* (PRBI; DeBaryshe & Binder, 1994) and *Familia Inventory* (Taylor, 1996). Demographic information relevant to the HLE was collected using a Parent Demographic Survey. Questionnaires examining the HLE along with a demographic survey were collected during a 6-week period from February to March during the 2011-2012 school year. HLE questionnaires and the parent demographic surveys were most often completed by the mothers (81%) of the preschool children. Due to the item-level nature of these data, surveys with missing data on items across the measures were excluded from the final analysis using list-wise comparisons. Complete questionnaires and surveys were collected from (n=158) families and included in the previous latent class analysis.

Measures

The *C-PALL* (Landry, Assell, Gunnewig, & Swank, 2005) is a criterion based measure of prekindergarten children's emergent literacy skills. The *C-PALL* (Landry et al., 2005) is available in both Spanish and English. Rapid letter naming subtests assess how many letters children can recognize in 60 seconds. Both upper and lowercase letters are presented to the examinee in his or her native language with scores ranging from (0-59). Phonological awareness items assess children's sound recognition and sound manipulation abilities by presenting items related to rhyming and segmenting

tasks. Scores range from (0-38) on the phonemic awareness subscale. The outcomes from the C-PALLs are supported by adequate alpha coefficients ranging from .40 to .80.

The *Tejas Lee* (Carlson, Branum-Martin, Durand, Barr, & Francis 2007) is a teacher administered criterion based measure of children's literacy skills in Spanish. The *Tejas Lee* (Carson et al., 2007) is comprised of subscales measuring ELL children's: Graphonemic Knowledge (i.e. letter knowledge) and Phonological Awareness (i.e. blending, rhyming, initial letter, and final letter sounds) skills in kindergarten and first grade.

Measurement of children's Graphonemic Knowledge skills rely on children to recognize individual letters presented and identify letters in printed words. These scores range from (0-30) in kindergarten and (0-14) in first grade. Phonological Awareness items measure children's abilities to recognize and manipulate letter sounds through rhyming and segmenting activities. The Phonological Awareness scale scores range from (0-41) and (0-42) respectively for kindergarten and first grade. Reliability coefficients reported on outcomes from the *Tejas Lee* range from .78 to .91 (Linan-Thompson, Bryant, Dickson, & Kouzekanani, (2005).

Scores for each scale were reported in two forms. The first is a continuous score of children's outcomes on the number of items answered correctly in each scale. The second is a rank score describing the children's continuous scale outcomes. Outcomes are ranked as *Developed (D)* or on grade level, *Expected Level (EL)* or the student has not yet mastered the skill, but is progressing towards mastery, and *Level of Intervention*

(LI) or student performance falls in the lowest 25% of the children evaluated in each classroom.

Data Analytic Strategy

The purpose of the current study is to examine if the variations confirmed in three-solution LCA on the HLE impacted ELL children's emergent literacy growth in Spanish. With identified latent classes on the HLE, we applied both latent growth and mixture-modeling approaches to the literacy outcomes collected for a sample of (n = 158) Mexican-American, ELL children. These analyses allowed for estimations of both the inter-individual and intra-individual patterns of change longitudinally over specific points in time considering the presence of non-normal data (Yuan & Bentler, 2000). In other words, we concurrently tested for differences in both group-related growth trajectories and individual change in ELL children's Spanish literacy skills (i.e. letter recognition and phonemic awareness skills) across nine specific points in time from prekindergarten to first grade.

We modeled literacy data reported on children's letter recognition and phonological awareness skills using MRL as the estimation method for both analyses. In the *Mplus* program (Muthén & Muthén, 1998-2015), there are options to produce "robust" standard errors. MLR represents maximum likelihood parameter estimates with standard errors and chi-square test statistics robust to non-normality and observation non-independence (MLR). MLR account for nonnormal and missing data (Yuan & Bentler, 2000).

It should be noted that missing data occurred across time points in the data reported by each school district. Children who demonstrated mastery criteria on either letter recognition or phonological awareness skills at the beginning of year or middle of year testing points were not assessed again until the following school year. For example, if a child demonstrated mastery criteria in letter recognition at Time 4 (i.e. BOY kindergarten), he or she was not evaluated again in this area until Time 7 (i.e. BOY first grade). All students were evaluated across the 3 testing times in prekindergarten (e.g. Time 1- Time 3).

Data analyses included the following three steps. First, a descriptive analysis of all included variables were conducted and evaluated. Second, all continuous data variables were converted to Z-sores for data smoothing and recoded using ordinal variables. These ordinal variables were reflective of four categories created from cut-off scores of the continuous data reported on literacy outcomes. Last, both latent growth modeling and mixture-modeling approaches with known classes were implemented separately to estimate hypothesized differences in patterns of ELL children's literacy growth trajectories related to the HLE.

Results

Descriptive Outcomes

Table 1.1 provides an overview of the strengths and weaknesses previously reported by caregiver's from two self-report inventories (i.e. *PRBI* & *Familia*) on the HLE. Outcomes from eleven scales were used to conduct a LCA. A three-profile solution emerged from the data. Differences reported by caregivers in this low SES,

Mexican-American sample illustrate the heterogeneity present in caregiver's literacy beliefs and practices.

Group membership assignments revealed 37% (n = 58) of the sample were assigned to Profile 1, LBLP, 16% (n = 25) to Profile 2, MBMP, and the greatest number (n = 75) or 47% of the sample were assigned to Profile 3, HBHP. The three-cluster solution was conformed from model fit statistics on: AIC = 3363.96, BIC = 3710.04, SABIC = 33.52.34, BLRT (p = .267).

Differences reported in outcomes on the HLE were tested for significance using self-report outcomes from the Parent Demographic Survey (Davis et al., 2016). As reported in Table 1.1, families in Profile 3 (HBHP) reported the highest scores in their literacy beliefs and practices. Parents assigned to the HBHP profile had a greater percentage of caregivers who reported higher education levels (e.g. some college) and incomes (> $45,000). These caregivers also reported having more books in the home, reading more frequently to their children, and reading more often to their children in English.

Caregivers assigned to the LBLP profile, in contrast, had the greatest percentage of caregivers who reported living in extreme poverty (i.e. < $15 K), with lower education levels (e.g. less than high school graduation), and more often speaking Spanish to their children in the home. A greater percentage of these caregivers, 79.3%, reported having fewest books in the home (i.e. < 10 books) and reading less frequently (i.e. < 2 times per week) to their children.

Table 1.1 Descriptive home literacy environment raw score outcomes

HLE Domain	N	Mean	SD	Range
Parent Demographics				
Home Language	158	1.16	.46	(1 – 3)
Number of Children	158	2.94	1.5	(1 – 11)
Reading Frequency	158	2.23	.65	(1 – 4)
Number of books	158	1.46	.85	(1 – 4)
Reading Language	158	2.27	.66	(1 – 3)
Family Income	158	1.89	1.25	(1 – 5)
Parent Reading Beliefs Inventory				
Teaching Efficacy	154	3.40	.41	(1.88 – 4.00)
Positive Affect	155	3.35	.40	(2.30 – 4.00)
Verbal Participation	150	3.58	.37	(2.38 – 4.00)
Reading Instruction	149	3.28	.45	(2.25 – 4.00)
Knowledge Base	149	3.37	.44	(2.00 – 4.00)
Resources	149	3.41	.61	(1.50 – 4.00)
Environmental Input	148	2.84	.75	(1.00 – 4.00)
Familia Inventory				
Family Shared Reading (English)	39	47.00	11.75	(11 – 65)
Family Shared Reading (Spanish)	117	64.09	18.98	(22- 93)

*Note. (N = 158). Parent Demographic Survey (PDS; Davis et al., 2016; Parent Reading Belief Inventory (PRBI; DeBaryshe & Binder, 1994; Familia Inventory (Taylor, 1996).

Moderate HLE outcomes were reported by the parents in Profile 2. More than half of these caregivers reported living in extreme poverty and having lower education levels than caregivers in Profile 3. These parents more often used Spanish in the home (88%). However, a greater percentage of these parents reported reading to their children in English and Spanish when compared to Profile 1. Greater percentages of these caregivers reported having few books (i.e. < 10 books) in the home and reading less often to their children (i.e. < 2 times per week) than caregivers assigned to Profile 3.

Literacy Outcomes

Descriptive outcomes on ELL children's literacy skills (e.g. letter recognition and phonemic awareness) are illustrated across nine points in time (i.e. prekindergarten to first grade) in Table 1.2. Literacy outcomes for all participants in the Year 01 (N = 252) RCT were included in the descriptive outcomes. It should be noted participants with missing data related to the HLE were excluded from further analysis.

All ELL children's literacy skills were evaluated across the 3 time points in prekindergarten (e.g. Time 1- Time 3)**.** During kindergarten and first grade**,** children demonstrating mastery criteria in their Spanish literacy skills during BOY or MOY testing points were not reassessed until the following school year. For example, children demonstrating mastery criteria in their letter recognition skills at Time 4 (i.e. BOY kindergarten), were not evaluated again until Time 7 (i.e. BOY first grade).

At Time 1, or at entry to prekindergarten children recognized (M = 5.55, SD = 7.11) letters in Spanish. In terms of their letter recognition skills as a group, they recognized only 9% of letters (0 – 59) in their native language. By the end of prekindergarten, at Time 3, their letter recognition skills increased (M = 23.61, SD = 12.54). However, at the end of prekindergarten these ELL children were only able to recognize 40% of letters in their native language.

Table 1.2 Descriptive literacy outcomes of the year one sample

Variables	N	Mean	SD	Range
Letters				
C-Pall Assessment				
Time 1	245	5.55	7.11	(0 – 39)
Time 2	226	17.64	11.37	(0 – 53)
Time 3	232	26.74	12.54	(0 – 59)
Tejas Lee Assessment				
Time 4	186	23.61	7.44	(0 – 30)
Time 5	96	25.70	6.35	(3 – 30)
Time 6	25	26.24	4.03	(13 – 30)
Time 7	188	9.50	4.93	(0 – 15)
Time 8	108	13.26	3.40	(0 – 15)
Time 9	14	11.57	4.91	(0 – 15)
Phonemic Awareness				
C-Pall Assessment				
Time 1	245	19.30	7.49	(0 – 38)
Time 2	226	27.96	7.02	(0 – 41)
Time 3	232	32.06	6.02	(0 – 43)
Tejas Lee Assessment				
Time 4	184	24.10	7.76	(0 – 30)
Time 5	94	27.17	5.17	(4 – 30)
Time 6	25	28.24	4.64	(8 – 30)
Time 7	187	13.57	3.72	(0 – 16)
Time 8	46	14.72	2.59	(1 – 16)
Time 9	8	14.63	1.85	(11 – 16)

**Note.* All means are raw scores. SD= standard deviation; Range= maximum score and minimum score.
Time 1= beginning of the year prekindergarten, Time 2= middle of the year prekindergarten, Time 3= end of the year prekindergarten, Time 4= beginning of the year kindergarten, Time 5= middle of the year kindergarten, Time 6= end of the year kindergarten, Time 7= beginning of the year first grade, Time 8= middle of the year first grade, Time 9= end of the year first grade.

These ELL children demonstrated greater Spanish phonological awareness skills (M = 19.30, SD = 7.49) at entry to prekindergarten and continued to demonstrate increases their phonological awareness skills (M = 32.06, SD = 6.02) across prekindergarten. These ELL children demonstrated greater Spanish phonological awareness skills (M = 19.30; 7.49) at entry to prekindergarten and continued to

demonstrate increases their phonological awareness skills (*M* = 32.06; 6.02) across prekindergarten.

Mean outcomes of ELL children's letter recognition skills at BOY in kindergarten were equal to (*M* = 23.61, SD = 7.44) outcomes reported at the end of prekindergarten (*M* = 23.61, SD = 12.54). However, deviations from the mean scores had decreased over time. Similar patterns were noted in children's phonemic awareness skills in kindergarten at beginning (*M* = 24.10, SD =7.76) and end of year (*M* = 28.24, SD = 4.64) testing points. Only (*n* = 25) children were assessed at the end of kindergarten on their letter recognition and phonemic awareness skills due to meeting established criteria at earlier testing points.

In first grade, children's BOY (*M* = 9.50, SD = 4.93) and EOY (M = 11.57, SD = 4.91) letter recognition skills were below the range of scores for this scale (0-15). Similar patterns were noted in children's phonological awareness skills at BOY (*M* = 13.57; 3.72) and EOY (*M* = 14.63, SD = 1.85) testing points. Very few ELL children were assessed on their Spanish letter recognition (*n* = 14) and phonemic awareness (*n* = 8) skills at the end of first grade.

Literacy Outcomes by HLE Profile

Table 1.3 reports on mean differences in ELL children's (n =158) literacy skills on letter recognition and phonological awareness variables related to the HLE across nine points in time. Overall, children assigned to the LBLP profile (*n* = 58) scored below or close to the group mean (see Table 1.3) on their letter recognition skills. Children assigned to the MBMP (*n* = 25) group scored at or below the sample mean

across all points in time (see Table 1.3) on both letter recognition and phonological awareness skills. The mean outcomes for ELL children assigned to the HBHP (n = 75) profile were consistently equal to or greater than group means on both letter recognition and phonemic awareness skill areas across all points in time (see Table 1.3). Next, we will examine the bivariate correlations between identified variables on the HLE and reported literacy outcomes.

Correlations

Bivariate correlations comparing letter recognition and phonological awareness outcomes across 9 points in time are shown in Table 1.4. Moderate to highly correlated, significant correlations were observed between the literacy variables across time. These variables were significant at $p < .01$ and $p < .05$. Literacy variables (see Table 1.5) were correlated with identified variables on the HLE (e.g. Parent Demographic Survey, *PRBI,* & *Familia*) and resulted in fewer significant correlations. Significant correlations ($p <$ .05) were most often related to scales from the *PRBI* (DeBaryshe & Binder, 1994). In the next section, we evaluate the latent mean outcomes obtained from the latent growth curve analysis.

Table 1.3 Literacy mean raw scores by LCA profile

	Letter Raw Scores									Phonemic Awareness Raw Scores								
Profile 1 (n = 58)																		
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
N	58	56	57	45	22	4	47	29	4	58	56	57	45	22	4	47	11	3
Mean	5.4	17.9	27.8	23.6	27.9	27.0	9.1	13.1	14.8	21.3	29.4	32.4	23.6	27.2	28.8	13.5	15.2	16.0
SD	5.7	10.5	11.8	8.0	4.5	4.2	5.0	3.4	0.5	6.6	5.7	5.9	8.9	5.6	1.5	3.9	1.4	0.0
%	37.2	37.6	36.8	36.9	39.3	28.6	39.2	42.0	57.1	37.2	37.6	36.8	37.5	39.3	28.6	39.2	42.3	60.0
Profile 2 (n = 25)																		
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
N	25	25	25	19	6	2	18	9	2	25	25	25	19	6	2	19	6	2
Mean	5.7	18.5	25.0	23.9	23.2	25.5	10.9	12.1	6.5	19.0	28.4	31.0	23.3	24.5	28.0	13.4	13.8	13.5
SD	6.82	12.4	13.0	7.93	9.79	3.54	4.74	5.40	9.19	8.09	6.28	8.15	8.79	8.73	1.41	3.98	2.64	3.54
%	16.0	16.8	16.1	15.6	10.7	14.3	15.0	13.0	28.6	16.0	16.8	16.1	15.8	10.7	14.3	15.8	23.1	40.0
Profile 3 (n = 75)																		
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
N	73	68	73	58	28	8	55	31	1	73	68	73	56	28	8	54	9	/
Mean	6.4	18.4	29.1	24.7	25.9	27.4	10.7	14.2	5.0	20.1	29.0	33.4	25.8	28.3	29.8	14.3	15.7	/
SD	8.32	11.3	12.9	6.24	4.94	1.69	4.16	1.18	/	6.91	6.73	4.98	5.76	3.30	0.46	2.73	0.50	/
%	46.8	45.6	47.1	47.5	50.0	57.1	45.8	44.9	14.3	46.8	45.6	47.1	46.7	50.0	57.1	45.0	34.6	/
Total Sample (n = 158)																		
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
N	156	149	155	122	56	14	120	69	7	156	149	155	120	56	14	120	26	5
Mean	5.9	18.2	27.9	24.2	26.4	27.0	10.1	13.5	11.0	20.4	29.0	32.7	24.6	27.5	29.2	13.8	15.0	15.0
SD	7.18	11.1	12.5	7.14	5.52	2.66	4.64	3.05	6.03	6.99	6.27	5.94	7.60	5.05	1.12	3.44	1.66	2.24
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 1.4 Correlations between literacy variable

	Letters									Phonemic Awareness								
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**
T1	1.00	.65**	.53**	.26**	.10	.00	.20**	.20*	.45	.34**	.30**	.27**	.28**	.04	.12	.21**	.38*	.61
T2	.65**	1.0	.82**	.50**	.30**	-.05	.40**	.30**	.58*	.32**	.53**	.46**	.48**	.23*	.15	.33**	.26	.51
T3	.52**	.82**	1.00	.56**	.43**	.05	.35**	.36**	.37	.32**	.52**	.54**	.56**	.38**	.24	.36**	.30*	.25
T4	.26**	.50**	.56**	1.00	.57**	.34	.53**	.39**	.20	.17*	.38**	.37**	.86**	.48**	.33	.41**	.30*	-.14
T5	.10	.30**	.43**	.57**	1.00	.38	.47**	.63**	.60	.19	.29**	.30**	.57**	.81**	.28	.56**	.46*	.70
T6	.00	-.05	.05	.34	.38	1.00	.34	.46	.26	.21	.28	.13	.20	.36	.77**	.60**	.84**	-.40
T7	.20**	.40**	.35**	.53**	.47**	.34	1.00	.51**	.38	.18*	.30**	.23**	.49**	.45**	.28	.60**	.30*	.45
T8	.21*	.30**	.36**	.39**	.63**	.46	.51**	1.00	.43	.17	.32**	.33**	.39**	.68**	.56*	.43**	.68**	.80*
T9	.45	.58*	.37	.20	.60	.26	.38	.43	1.00	.66*	.60*	.69*	.14	.24	.30	.70**	.61	.80

**Note.* ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). / Cannot be computed because at least one of the variables is constant.

Table 1.5 Correlations between literacy and HLE variables

		Home Literacy Environment Variables													
		CLD	**Read**	**BK**	**Lang**	**IN**	**PRBI**	**PRBI**	**PRBI**	**PRBI**	**PRBI**	**PRBI**	**PRBI**	**FAM**	**FAM**
LE	**T1**	-.09	.07	.10	-.11	.13	.02	.04	.05	.08	.08	.03	-.02	.03	.09
	T2	-.04	.07	.11	-.06	.06	.07	.04	.00	.08	.07	.00	.01	-.11	-.07
	T3	-.14	.14	.20*	-.03	.09	.06	.05	.02	.03	-.02	-.02	.07	-.17	-.07
	T4	-.17	.06	.13	.15	.09	.16	.06	.08	.17	.10	.13	.15	-.35	.19
	T5	-.07	-.20	-.31	.13	.16	.10	-.03	-.28	-.11	-.23	.03	-.01	-.54	-.11
	T6	.11	.00	.28	-.22	.49	-.25	-.24	.07	-.15	-.34	.06	-.11	-.78	.14
	T7	-.10	.10	.01	.00	.07	.17	.15	.16	.25**	.13	.33**	.19	-.20	.15
	T8	-.03	.09	.07	.09	.08	.34**	.28*	.12	.19	.08	.15	.15	-.08	.18
	T9	.06	-.44	-.44	.48	-.40	-.03	.12	-.50	-.27	-.03	-.45	-.58	/	.20
PA	**T1**	.00	.07	.03	-.06	.04	.05	-.05	-.05	-.02	.08	-.07	-.07	-.06	.01
	T2	-.03	.07	.10	.05	.08	.04	.03	-.06	.02	.06	-.01	-.01	.00	-.05
	T3	-.07	.14	.14	.06	.05	.10	.08	.03	.01	.05	.01	.10	-.06	.04
	T4	-.17	.07	.11	.19*	.10	.20*	.14	.09	.20*	.08	.22*	.23*	-.25	.20
	T5	-.03	.03	.15	.12	.01	.28*	.16	-.12	.01	-.09	.24	.08	-.24	.05
	T6	-.25	.37	.55*	.06	.45	.02	-.05	-.19	-.06	-.20	.10	.37	/	-.09
	T7	-.17	.03	-.06	-.05	.04	.19*	.09	.04	.17	.19*	.17	.23*	-.03	.17
	T8	.28	.26	-.09	-.01	.07	.14	.39*	.09	.02	.21	-.10	-.03	-.02	.19
	T9	.38	-.25	.25	.25	-1.0	.18	.41	-.56	-.38	-.10	-.06	-.40	/	-.90

**Note.* LE= Letter Recognition; PA= Phonemic Awareness. ** Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). / Cannot be computed because at least one of the variables is constant.

Latent Growth Models

A multiple-group, latent growth curve analysis was modeled on standardized coefficients of children's literacy skills to examine for hypothesized differences in ELL children's literacy trajectories over time. Analyses were conducted simultaneously, but separately, to analyze if variability reported within the three HLE profiles (i.e. LBLP, MBMP, HBHP) impacted children's literacy growth across eight points in time (i.e. BOY prekindergarten to MOY first grade). Data from time point 9 (i.e. EOY first grade) were not included in the analysis due to non-normal missing data.

Several growth curve models were employed to identify a best fit model of the data. The first model reported on the standardized coefficients of the mean intercepts (i.e. starting point) and mean slopes (i.e. rate of change) of the literacy outcomes considering HLE profile assignments. However, the model did not converge and resulted in no chi-square statistics being computed.

The second model reported on the impact of HLE profile assignment on the literacy outcomes reported across nine points in time (e.g. prekindergarten (BOY) to first grade (EOY). Once again, the model did not converge, resulting in no chi-square statistics being computed. Latent growth curve analyses with assigned group membership comparing the latent mean outcomes between profiles (e.g. profile 1 vs profile 2 vs profile 3; profile 1 vs profiles 2 & 3) across time points (e.g. Time 1 to Time 9) also did not converge on the data provided.

Growth Mixture-Model

A growth mixture-model analysis with known classes was employed to examine if differences were present in identified growth parameters (i.e. slope and intercept) across the unobserved subpopulations (i.e. categorical variables). Coefficients for this analysis were reported in unstandardized form because of the mixture analysis (see Table 1.6). This analysis only provides standardized results when using an integration algorithm in *Mplus*. The numerical integration becomes computationally demanding when involving many parameters and increasing sample sizes (Muthén & Muthén, 1998-2015). Therefore, we adopted and reported on unstandardized coefficients for letter recognition and phonemic awareness variables.

Table 1.6 Unstandardized coefficients for mixture modeling for categorical outcomes

		Profile 1	*p*	Profile 2	*p*	Profile 3	*p*
Letters	Intercept	1.26	0.560	0.03	0.988	-0.83	0.699
	(*SE*)	2.16		1.95		2.13	
	Slope	0.52*	<.001	1.63*	<.001	0.45*	<.001
	(*SE*)	0.07		0.12		0.09	
PA	Intercept	-0.21	0.949	0.09	0.979	-1.93	0.584
	(*SE*)	3.31		3.15		3.53	
	Slope	-0.10*	0.012	-0.12*	0.030	0.02	0.833
	(*SE*)	0.04		0.06		0.11	

**Note*. All coefficients were unstandardized; * indicates significant at alpha level.

Using a mixture modeling analysis with known classes, we tested for hypothesized group differences in developmental patterns (e.g. slopes and intercepts). Comparisons were made between the starting points and growth rates in ELL children's letter recognition and phonemic awareness skills across time considering group

assignment to the HLE. All children demonstrated significant growth in their letter recognition skills. Children assigned to Profile 2 (MBMP) demonstrated the greatest growth rates across time in their letter recognition skills (see Table 6). ELL children assigned to the Profile 1 (M = - .10, SD = .06, $p < .05$) and Profile 2 (M = - .12, SD = .04, $p < .05$) demonstrated significant decreases in their Spanish phonemic awareness skills from prekindergarten to first grade.

Percent of Ordinal Outcomes

To better understand patterns reported in the mixture-model outcomes of categorical variables, the percentages of ELL children tested at each time point and assigned to each ordinal category (e.g. 0 = low, 1 = emerging, 2 = grade level, 3 = mastered). At time 1 in prekindergarten, on both literacy variables, the greatest number of children were assessed with the greatest percentage of students falling into low performing categories for both variables.

At time 3, the greatest percentage of students in the MBMP and HBHP profiles fell into the grade level category on their letter recognition skills while the greatest percentage of children in the LBLP profile remained in the emerging category. This pattern continues to repeat itself across kindergarten (e.g. time 4 to time 6) and first grade (e.g. time 7 to time 9). Specifically, the data reported on children's phonemic awareness skills reveal the majority of the children demonstrated mastery at time 7 (e.g. BOY first grade) and 100% of the children assigned to the LBLP and MBMP profiles demonstrated mastery in their phonemic awareness skills at time 9 (e.g. EOY first grade).

Discussion

The purpose of the current study was to investigate whether variations in the HLE impacted ELL children's emergent literacy growth in Spanish. We identified three latent classes of the HLE and applied both latent growth curve and mixture-modeling approaches to the literacy data collected of 158 Mexican-American, ELL children. These analyses allowed for estimations of both the inter-individual and intra-individual longitudinal patterns of change over specific points in time.

Latent-growth curve models of children's letter recognition and phonological awareness skills based on group assignment to HLE profiles allowed for longitudinal examination of the growth in ELL children's literacy skills from prekindergarten to first grade. Findings revealed one model fit of the literacy data across four points in time. Significant growth trajectories were observed for both literacy variables across the entire sample of children**.** From time point 1(e.g. beginning of pre-K) to time point 4 (e.g. beginning of kindergarten) children significantly grew in their letter recognition and phonemic awareness skills. However, no differences were found in children's growth patterns based on HLE profile.

Further examination of the literacy variable parameters (e.g. slope and intercepts) using a mixture-model analysis revealed significant outcomes related to the HLE. While all children significantly grew in their letter recognition skills, children assigned to Profile 2 demonstrated the greatest growth rates. Significant differences were noted in the growth rates of children's phonemic awareness skills. However, decreasing slopes were documented for children assigned to Profiles 1 and 2 across prekindergarten to first

grade. Examination of the intercepts or starting points of the literacy variables did not reveal any significant outcomes.

Previous researchers pointed out parallel patterns in Spanish-speaking children's literacy development relative to English-speaking children's literacy skills (Farver et al., 2006; Lonigan, et al., 2013; Mancilla-Martinez & Lesaux, 2011; Páez et al., 2007; Rodriguez & Tamis-LeMonda, 2011). The longitudinal analysis used in this study adds support to the assertion that ELL children entering U.S. schools do not always demonstrate homogenous language and literacy abilities. At entry into prekindergarten, on average, ELL children evaluated in this sample demonstrated average Spanish phonemic awareness skills (see Table 3). However, 85% of these ELL children exhibited letter recognition skills that were well below average. The Spanish literacy outcomes documented in prekindergarten for these ELL children support align with latent-growth curve analyses. All children, regardless of HLE profile assignment, demonstrated similar outcomes on literacy measures (see Table 3). These children also demonstrated lower outcomes on measures of their letter recognition skills and demonstrated greater growth trajectories in this skill area. The ELL children in this study exhibited greater phonological awareness skills upon prekindergarten entry and their growth trajectories of phonemic awareness skills were relatively low.

It is possible that greater exposure to adult conversations primarily in Spanish increased these children's Spanish phonological awareness knowledge prior to school entry; the vast majority of their families reported speaking Spanish in the home. Previous research by Páez and colleagues (2007) found children exposed to only Spanish

in the home scored lower on measures of Spanish phonological awareness skills in comparison to ELL children who were exposed to both English and Spanish in the home. However, research also links children's oral proficiency skills in Spanish to greater acquisition in their Spanish phonological awareness skills (López & Greenfield, 2004). Although we did not include children's Spanish oral language proficiency outcomes in this analysis, incorporating this type of information in future studies might further explain differences reported on the HLE in relation to children's literacy trajectories over time.

Children in this sample demonstrated lower outcomes on measures of their letter recognition skills. Development of letter knowledge skills early on in the home often requires more direct instruction (Lonigan et al., 2000). Providing direct literacy instruction in the home may not align with the cultural expectations of these Mexican-American families. Acculturation to U.S. schooling norms may play a greater role in the HLE of diverse families (Reese, Garnier, Gallimore, & Goldenberg, 2000). Spanish-speaking families may not acknowledge U.S. schooling norms or assume the same cultural beliefs as Caucasian families in providing literacy instruction to young children in the home (Castro et al., 2012). Future research should consider examining how differences in reports on families' acculturation levels to U.S. schooling norms impact outcomes obtained on the HLE and children's literacy development over time.

As hypothesized, the HLE was additive in promoting children's literacy growth rates for children assigned to Profile 2. While it was hypothesized children in Profile 1 would demonstrate the greatest growth rates from prekindergarten to first grade, children

assigned to Profile 2 (MBMP) demonstrated significantly greater growth rates in their letter recognition skills compared to children in Profiles 1 and 3. Families assigned to Profile 2 had the greatest percentage of parents who endorsed direct shared book reading instruction in the home (Davis et al., 2016). Previous research shows children who demonstrate greater literacy skills in Spanish when they enter school also have parents who report greater literacy beliefs and practices in providing a qualitative HLE to their children (Cottone, 2012; Lonigan et al., 2013). These findings again confirm parental literacy beliefs and practices, regardless of a families' background or economic strata, drive the quality in the HLE children encounter prior to entering school.

Significant differences were also observed in phonological awareness skill growth rates for children assigned to Profiles 1 and 2. Their Spanish phonological awareness decreased over time, while children assigned to Profile 3 exhibited growth in phonological awareness. While speculative, decreases in this skill area among children assigned to Profiles 1 and 2 may be related to increases in their exposure to English once they entered prekindergarten. A greater percentage of the parents assigned to Profiles 1 and 2 reported using primarily Spanish in the home while more families assigned to Profile 3 reported speaking both English and Spanish in the home (Davis et al., 2016). With a decrease in the amount of time children encountered conversations in Spanish in the home and an increase in their exposure to English, these ELL children may have begun to transfer knowledge of their literacy skills in Spanish to English (Metsala & Walley, 1998).

The impact of long-term exposure to extreme poverty reported by these Mexican-American families possibly mitigated differences in the HLE over time (Reese & Goldenberg, 2008). It was anticipated that children assigned to Profile 3 (HBHP) would demonstrate greater growth curves and rates in their literacy trajectories given these children entered prekindergarten with greater mean performances on measures of their literacy skills. However, these children demonstrated less growth rates than children assigned to Profile 2. More than half of their parents reported earning annual incomes of less than $15,000, having fewer than 10 books in the home, and reading to their children 1 to 2 times per week (Davis et al., 2016). Compared to more advantaged mothers, these Mexican-American mothers reported sociodemographic variables which all contributed to the risk-factors faced by these young ELL children prior to entering U.S. schools (Coddington, Mistry, & Bailey, 2014; Payne et al., 1994; Phillips & Lonigan, 2009; Manz, Hughes, Barnabas, Bracaliello, & Ginsburg-Block; Sénéchal & Lefevre, 2002).

The strengths and weaknesses reported by these Mexican-American families on the HLE reflects how these parents are invested in their children's education regardless of the risks they encounter. While relative to this sample, it becomes more evident ELL children entering U.S. schools from diverse homes do not always demonstrate homogenous language and literacy abilities. Evaluating the impact of social risk factors, cultural differences, and acculturation levels of Mexican-American families on the HLE may provide a greater insight into how HLE practices reported by diverse families can be leveraged to support Spanish-speaking children's early literacy development.

Key to research on ELL children's literacy development and confirmed in this study is further examination of the within group variability reported by diverse families on the HLE and how differences in the early literacy experiences children receive can prekindergarten instruction ELL children often receive. High quality literacy instruction during early elementary years may better support ELL children in acquiring the rudimentary blocks of reading in their native language. Identification of the strengths and weaknesses ELL children demonstrate in their literacy skills at entry to school could assist educators in capitalizing on developed skill areas to support differentiation in the literacy instruction provided to young children (Sénéchal & Lefevre, 2002; Payne et al., 1994; Whitehurst & Lonigan, 1998). The qualitative differences in the HLE diverse children enter schools from may shed light on how to approach early literacy instruction to promote ELL children's literacy development in prekindergarten.

Considering the differences in ELL children's literacy abilities and qualitative differences in their exposure to language and literacy in the home prior to entry to school could more effectively link each child to individualized quality instructional literacy practices. While differences in reports on the HLE of Mexican-American families may not be reflective of U.S. schooling norms, the strengths and weaknesses these low SES families possess are additive in preparing children for high-quality literacy instruction when they enter school. The HLE of children entering schools from low SES, Spanish-speaking homes may not be as substantial in promoting children's literacy development when compared to their same-aged Caucasian peers, but it clearly primes ELL children to begin receiving literacy instruction in their native language at entry to school.

Conclusions

While research on Latino children's literacy development continues to emerge, fully understanding how differences in the HLEs of Latino families of Mexican-American decent continues to evolve (Reese & Goldenberg, 2008). The current study sought to extend the current literature base on the HLE by examining Latino families and their ELL children. Findings showed that there was considerable variance in the HLEs of these families. Further, the three HLE profile groups showed differential literacy development over time. In addition, our findings that some families reported high-quality literacy interactions in the HLE parallels findings reported in studies monolingual, English-speaking children's literacy development (Sénéchal & Lefevre, 2002; Payne et al., 1994; Whitehurst & Lonigan, 1998). Specifically, ELL children with parents who reported providing a greater HLE also demonstrated greater literacy growth in their letter recognition skills over time. However, caution should be taken when generalizing these findings to other Latino families given these outcomes are normative to the sample evaluated.

Limitations

The results of the current study should be interpreted with respect to several limitations. First, data used to evaluate the HLE were collected from self-report inventories of parent behavior in the home. While reliability indices of these inventories and data collected reflect adequate measures of parent reports of the HLE, additional direct observation methods could further validate literacy behaviors occurring in families homes (Phillips & Lonigan, 2009).

Second, data collected and reported on ELL children's literacy skills were based on teacher reports. While criterion-based measures were delivered by trained teachers in each school district, patterns in the data were only reflective of the required skills set by the school district for each academic year. The lack of reliability indices on the literacy outcomes collected and the professional implications teachers face when children do not demonstrate grade-level mastery on identified literacy measures should be considered when interpreting outcomes reported in these analyses.

CHAPTER III

A CRITICAL REVIEW OF STANDARDIZED TESTS ON THE HOME LITERACY ENVIRONMENT

Prior research on the HLE underscores the critical dimensions of children's literacy experiences and ways in which the home can contribute to children's early language and literacy development (Roberts et al., 2005; Sénéchal & LeFevre, 2002; Payne et al., 1994; Whitehurst & Lonigan, 1998). Significant variability exists in research on the dimensions, contextual variables, and standardized measures used to examine the HLE. Without consensus on key factors that comprise the HLE, the degree to which critical characteristics are reflected in the HLE assessments and implications for how the HLE is accounted for in research remains unclear (Baroody & Diamond, 2012). Despite evidence supporting the use of the HLE in general to examine differences in children's language and literacy skills, significant variability exists in the tests and outcomes reported in research. The purpose of this study was to critically examine standardized tests and measurement practices used to define and assess the HLE.

The HLE is often considered the context in which children are first exposed to language and literacy through parent-child interactions in the home (Bracken & Fischel, 2008; Hammer, et al., 2003; Hart & Risley, 1995; Payne, Angell, & Whitehurst, 1994; Weigel et al., 2005). The dimensions and characteristics most often evaluated in research on the HLE include: the frequency of shared book reading practices (Bennett, 2002; Manz et al., 2010; Payne et al., 1994), the frequency of the language and literacy

activities occurring in the home (Bennett, 2002; Burgess, 2005; Caldwell & Bradley, 1993), children's exposure to print materials in the home (Baker, 2013), the number of books in the home (Bennett, 2002; Baroody & Diamond, 2012; Payne et al., 1994), the number of times a family accesses the library (Chaney, 1994; Caspe, 2009; Gonzalez, 2011), and parent reports on their literacy beliefs, knowledge, and practices (DeBaryshe, 1994; Taylor, 1996). HLE measures may use one or more of these factors in assessing this construct, however, these factors are not consistently reflected in these measures.

Associations made in HLE research primarily examine the impact of the HLE on children's language and literacy skills. Differences reported by caregivers on families' SES and variables related to the context of the HLE are often overlooked when examining differences noted in children's literacy abilities (Coddington et al., 2014; Manz et al., 2010). Historically research on the HLE has examined reports from mainly Caucasian families and its impact on English-speaking children's language and literacy outcomes (Roberts et al., 2005; Sénéchal & LeFevre, 2002; Payne et al., 1994). Studies show Caucasian parents who more frequently engage in high quality language and literacy activities in the home more often have children who demonstrate greater school readiness skills at entry to school and continue to demonstrate greater achievement across their school careers (Payne et al., 2014; Hood et al., 2008; Stephenson et al., 2008). However, the differences reported by more diverse families on contextual variables related to the HLE are often compared to English speaking families. When this happens, children from diverse backgrounds often perform below children entering schools from Caucasian families on measures of language and literacy at entry to school

(Coddington et al., 2014; Hood et al., 2008). These differences may reflect cultural practices rather than differences in children's language and literacy abilities.

Without consensus on clearly defined construct of the HLE, which is culturally sensitive to differences reported on variables related to the context of the HLE, threats to the validity of the outcomes reported increase (AERA, 2014). Additionally, the implications made in research on the HLE often focus on how early language and literacy practices contribute to children's literacy development over time. With an increase in the diversity of children enrolled U.S. schools (U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2014), it is critical to identify standardized measures of the HLE which account for differences reported by families from diverse backgrounds on the HLE. In the next section, we review the psychometric properties warranted in standardized tests developed to measure the HLE.

Psychometrics of Standardized Tests

A test is as a set of tasks designed to elicit responses or a scale used to describe examinee behavior to obtain a sample of an individuals' behavior in a specified construct (AERA, 2014). A construct is defined as the key characteristics of selected domains that tests are intended to measure (AERA, 2014). The use of psychometrics and consideration of key principles in developing test items for standardized tests increases the likelihood relevant characteristics of the identified constructs will be reflected in the developed test items (AERA, 2014). Psychometric properties relevant to the use of standardized tests in applied research settings often include the validity and reliability

coefficients reported on the developed measure (AERA, 2014). Validity is the "degree to which empirical evidence and theory support the interpretations of test scores or other modes of assessment." (AERA, 2014). Reliability refers to the consistency of quantifying, evaluating, and interpreting assessment outcomes (AERA, 2014).

The consideration of key psychometric features often decreases threats to the validity and reliability of the outcomes reported in research. Larger coefficients reported on both psychometric properties increases the likelihood the outcomes obtained reflect key characteristics of the construct being measured (AERA, 2014). Outcomes obtained from valid, reliable tests increases the generalization of study findings to different populations examined in research on the HLE. The lack of a clearly defined construct and limited research on diverse populations requires further examination of the standardized tests and outcomes reported in research on the HLE.

Alongside concerns of threats to the validity and reliability in the outcomes reported are the different types of measurement tools used to collect samples of parent's language and literacy practices in the home. Differences in the types of measurement tools used in research often influence the outcomes reported (Campbell & Fiske, 1959). Choices of measurement techniques, such as surveys or direct observations or self-report versus reports from others, pose risks to the key psychometric properties in the outcomes obtained reported on standardized tests (Campbell & Fiske, 1959; Fiske, 1987).

The importance in using standardized tests which result in outcomes that accurately reflect key dimensions of the construct being measured and acknowledge potential threats to the validity and reliability of the outcomes obtained are key to sound

assessment practices (AERA, 2014; Suen & Ary, 1989). By further examining identified peer-reviewed articles on the HLE, we will be able to report on the current state of assessment practices on the HLE.

Present Study

In order to evaluate trends reported in research on the dimensions and standardized tests used in research on the HLE, a critical review was conducted. The goal and scope of the proposed review entailed a systematic literature search of peer-reviewed articles employing standardized measures of the HLE. The current study also reported on current assessment practices reported in published research that included an examination of the HLE. Specifically, the purpose of this review was to (a) identify and evaluate published research studies that met our screening and inclusion criteria, (b) identify standardized assessments that were used to examine the HLE, (c) identify the various dimensions and contextual variables prior studies have reported on the HLE, and (d) identify gaps existing in the literature and future research needs. The following questions are addressed:

1. What trends are most often reported in study and participant characteristics among published studies of the HLE?
2. Which standardized tests, constructs, and relevant psychometric properties are most often reported on standardized measures of the HLE?
3. Which outcomes and implications are most often reported from measures of the HLE in research?

Method

Search Criteria

A systematic search was conducted using Proquest and EBSCO platforms to search for the identified terms in the following online databases: ERIC, Medline Complete, PscyhINFO, and Psychology and Behavioral Science. Separate searches were conducted on identified terms in each database. The search was limited to peer-reviewed, scholarly journal articles in English published from 1960-2016. Key search terms included: "*home literacy environment*", "*emergent literacy", "home learning environment", "family literacy", and "parental involvement."* The literature search outlined in Figure 1.1 was completed in August 2014 and updated in February 2016. After the removal of duplicate studies, the initial literature search resulted in 2,858 articles and the follow-up search resulted in 8 additional articles for a total of 2,866 articles.

Screening Criteria

To narrow the focus in identifying studies employing standardized tests on the HLE, screening criteria were employed as outlined in Figure 1.1. These criteria were used to identify relevant peer-reviewed articles in the HLE literature base. Each article was evaluated independently by the primary author and an independent researcher. The titles and abstracts of each article were searched for the following key terms: *home literacy environment, home learning environment, family literacy, and parental involvement.* Each article was coded using the following: 0 = *does not contain key words;* 1 = *contains key words*; 2 = *needs further revie*w and resulted in 283 articles.

Inclusion Criteria

Studies meeting the following inclusion criteria were included in the literature review: (a) contained a standardized assessment of the HLE, (b) conducted in the United States, and (c) included outcomes on children's language or literacy abilities. A standardized assessment was defined as a commercially available or researcher-developed measure of the HLE. The setting criteria was defined as data collected in a community, Head Start, or school in the United States. Of the 283 articles reviewed, 51 were selected for further evaluation. The remaining articles were excluded from further review because they failed to include relevant language or literacy outcomes (n = 117) were not conducted the United States (n = 49), and/or did not employ a standardized measure of the HLE (n = 65).

Coding Procedures

Each article was systematically examined to identify relevant study information on identified key variables. First, descriptive data were extracted from each study regarding participants' characteristics, study characteristics, and standardized test variables. Second, data were coded using a drop-down list of abbreviations developed for each variable by the first author. All data extraction and coding procedures were conducted independently by the first author and a second independent coder who had been training by the lead researcher.

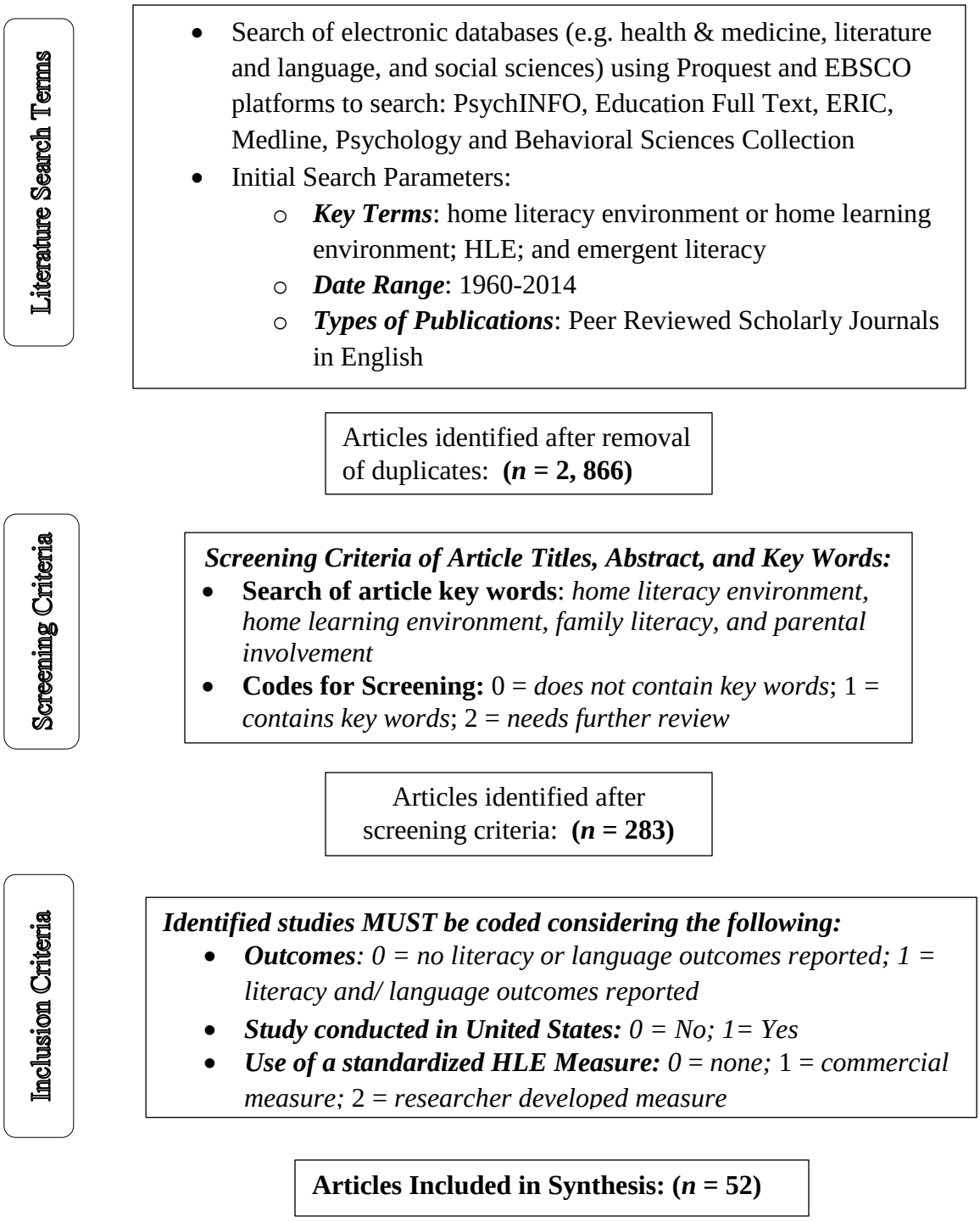

Figure 1.1. Flow diagram of articles selected.

Participant Characteristics

Descriptive data were extracted on the following participant variables: (a) the number of participants, (b) ages, (c) ethnicity, (d) gender, (e) language most often used in the home, (f) socioeconomic status (SES), and (g) variables related to the family of participants reported in each study.

Study Characteristics

Study characteristics coded for each study included: (a) year of study, (b) setting or grade where the study took place, (c) the type of analysis employed in the study, (d) the type of HLE variable(s) used in the analysis (e) type of child outcomes reported, (f) significant outcomes reported, and (g) study implications.

Standardized Test Variables

Descriptive information about the standardized test measures of HLE included: (a) name of test or authors of researcher developed measure, (b) form of the standardized test (e.g. commercialized or researcher developed), (c) type of test (e.g. direct or indirect), and (d) reliability coefficients reported on the test for the sample data collected in each study.

Inter-Rater Agreements

Screening and Inclusion Criteria

Inter-rater agreement (IRA) was calculated by dividing the total number of agreements (i.e., instances when two raters assigned the same code) by the total number of disagreements, then multiplying by 100 (Suen & Ary, 1989). Inter-rater agreement between the first author and an independent researcher was assessed for 100% of the

articles. IRA percent agreement outcomes were 93% and 95% respectively on developed screening and inclusion criteria. All disagreements were reviewed by the first author and independent researcher and agreed upon by the two raters.

Participant Characteristics

Inter-rater agreement between the first author and an independent researcher was assessed for 100% of the identified variables. IRA percent agreement outcomes were 95% on the developed codes of the descriptive data. All disagreements were reviewed by the first author and independent researcher and agreed upon by the two raters.

Study Characteristics

Inter-rater agreement between the first author and an independent researcher was assessed for 100% of the identified variables. IRA percent agreement outcomes were 94% on the developed codes of the descriptive data. All disagreements were reviewed by the first author and independent researcher and agreed upon by the two raters.

Standardized Tests

Inter-rater agreement between the first author and an independent researcher was assessed for 100% of the identified variables on standardized tests employed to measure the HLE. IRA percent agreement outcomes were 96% on the developed codes of the descriptive data extracted on standardized measures. All disagreements were reviewed by the first author and independent researcher and agreed upon by the two raters.

Results

We critically examined 52 published studies that (a) employed a standardized measure of the HLE, (b) reported outcomes on children's language and/or literacy skills,

and (c) were conducted in the United States. Variations in the measures and reported outcomes were observed

Across the 52 studies in our review, a total 30,045 child participants were involved. As shown in Table 1.7, their ages ranged from birth to 144 months. The majority of studies, 53.8% (*n* = 28), involved children ranging in age from 36 to 74 months. Thirty-five percent (*n* = 18) of the studies reported child age ranges for the participants or ages at multiple points in time (e.g. 1 month, 6 months, 9 months). Children under the age of 30 months were examined in 4 studies and two studies did not report information on the age of the participants.

Forty-seven studies provided information the ethnicity of the sample. These included African American, Asian, Caucasian, Hispanic, Latino, Pacific Islander, Native American, and Other. Most often, Caucasian was reported as the majority ethnicity of the participants evaluated. Specifically, 59.57% (*n* = 28) of the studies reported Caucasian children as the majority of participants. Children of African American decent were the majority population evaluated in 23% (*n* = 11) of the studies. Children of Hispanic or Latino decent were the majority population examined in only 17% (*n* = 8) of the studies. The language of majority for the sample was reported in 33 studies. Among those that reported majority language, English predominant in 70% (*n* = 23) of them.

Table 1.7 Study participant outcomes

Authors	Setting	Age (months)	Ethnicity	Lan	SES	Family Variables
Anthony et al.,2014	HS	54	**AA**, CAU, HISP, O	E	Low	NR
Baker & Iruka, 2013	K	74	AA	E	Low	EDU, MAR, MH, FS
Baker et al., 2012	K	74.19	AA (boys only)	E	Low	AGE, EDU, FS
Baker, 2013	PK	52	AA, CAU	E	NR	AGE, MAR, EDU, EMP
Baker, 2014**a**	PK	53.71	HISP	S	Low	MLANG
Baker, 2014**b**	PK	52	AA	E	Low	EDU
Baroody & Diamond, 2012	HS	55.9	AA, **CAU**, HISP, O	E	Low	AGE, EDU
Bennett, 2002	PK	50.9	AA, **CAU**, HISP, PSI	E	Med	EDU, EMP, MAR
Boyce et al., 2010	HS	41.43	LAT	S	Low	MAGE; MAR;FS;POB
Boyce et al., 2013	COM	30	LAT	S	Low	ACL; MAGE; EDU; FS
Bracken & Fischel, 2008	HS	52.8	CAU, **AA, HIS**, O	NR	Low	EDU, AGE, FS
Bradley et al., 2011	EHS	52.8	**AA**, HIS, CAU	E	Low	NR
Britto & Brooks-Gunn, 2001	COM	7	AA	NR	Low	MAGE. EDU, MAR
Burgess, 2002	PK	64.92	CAU	NR	Med	NR
Caspe, 2009	HS	57-61	LAT	B	Low	ACL, EDU, MAGE,
Chaney, 1994	PK	45.6	NR	NR	ALL	NR
Chazana et al., 2013	HS	48	NR	NR	Low	NR
Connor et al., 2005	1st	NR	AA, ASI, **CAU**, HISP, O	E	Vary	MEDU
Cottone, 2012	PK	47-59	AA, CAU, HIS, NA	E	Vary	MEDU
Dever & Burts, 2002	K/1st	73.2	CAU	NR	NR	EDU, MAR
Edwards, 2012	COM	26.73	CAU	NR	M/H	MAGE, MEDU
Farver et al., 2006	HS	54.51	HIS, LAT	S	Low	MAGE, EDU, MAR, EMP
Foster, 2005	HS	42 -76	AA, CAU, O	E	Low	MAR, POB
Froiland, 2014	HS	53.24	AA, **CAU**, LAT, O	E	Low	EDU

Table 1.7 Continued

Froyen et al., 2013	PK	32 to 64	AA, ASI, **CAU**, HIS, NA	E	Med	MAR, MEDU
Haak et al., 2012	NR	1 - 60	AA, **CAU**, O	NR	Med	MEDU
Hammer et al., 2003	HS	45.6	LAT	S	Low	MEDU, MLANG, POB
Hammer et al., 2010	HS	49.77	AA, **CAU**, HIS, O	NR	NR	MEDU, MAR
Hart et al., 2009	COM	50.75-69.33	CAU	NR	NR	EDU, MAR
Johnson et al., 2008	K/1st	73.2	CAU	NR	NR	MEDU, MAR
Jordan et al., 2000	K	NR	CAU	E	Low	NR
Lewis et al., 2015	HS	55.83	LAT	S	Low	MEDU, POB
Marcella et al., 2014	COM	36	AA, ASI, CAU, **LAT**, PSI, O	B	Low	MEDU, POB
McGrath et al., 2007	NR	68.4 - 85.2	CAU	NR	NR	EDU
Mol et al., 2014	NR	13.68	CAU, AA, O	E	Med	EDU, MAR
Payne et al., 1994	HS	48	CAU	E	Med	EDU
Raikes et al., 2006	EHS	7 - 28	AA, **CAU**, HIS, O	E	NR	EDU, MAR
Ricci, 2011	NR	10.48	AA, **CAU**, HIS, O	E	Low	EDU
Roberts et al., 2005	COM	9 - 42	ASI, **CAU**, HIS, O	S	M/H	MAGE, EDU, EMP, MAR
Rodriguez et al., 2009	HS	14 - 36	AA, **CAU**, HIS	E	Low	EDU, EMP, MAR, MAGE
Rodriguez & Tamis-LeMonda, 2011	HS	15 - 63	AA, CAU, HIS, O	E	Low	AGE, EDU, MAR, EMP
Sawyer et al., 2014	PK	56	AA, **CAU**, HIS, O	E	M/H	EDU, Disabilities
Scarbrough et al., 1991	PK	NR	NR	NR	Med	NR

Table 1.7 Continued

Skibbe et al., 2008	COM	48 - 60	AA, ASI **CAU**, HIS, O	E	Med	EDU
Speece et al., 2004	NR	60-108	AA, **CAU**, LAT, O	E	Low	NR
Ullery et al., 2014	COM	18 -36	**AA**, ASI, CAU, LAT	NR	NR	EDU, drug use
Weigel et al., 2005	COM	49.7	ASI, **CAU**, HIS, PSI, O	NR	Med	AGE, EDU
Weigel et al., 2006	COM	49.7	ASI, **CAU**, HIS, PSI, O	NR	Med	AGE, EDU
Weigel et al., 2010	COM	49.7	ASI, **CAU**, HIS, PSI, O	NR	Med	AGE, EDU, Family Resource
Whaley et al., 2011	COM	39 - 51	HIS	E/S	Low	EDU, EMP, MLANG
Zaslow et al., 2006	COM	36 - 48	AA	NR	Low	MAR, FS, EDU

**Note.* Setting variables: Early Head Start= EHS; Head Start= HS; Community= COM, Prekindergarten= PK, Kindergarten= K, 1st= First grade; Ethnicity variable: AA= African American, ASI= Asian, CAU= Caucasian, HIS= Hispanic, LAT= Latino, PSI= Pacific Islander, O= Other, NA= Native American or multiracial; bolded labels indicated 40% or greater reported in each study; Language Variable= Lang.; E= English, S= Spanish, B= both; SES= Low= less than $40,000, Med= greater than $40,000, M/H= incomes greater than $60,000 reported; Family Variables: AGE= age of parents, EDU= education of both parents, EMP= employment, FS= family size; MAR= marital status, MEDU= maternal education, MLANG= maternal language, POB= place of birth; NR= not reported across all variables.

Table 1.8 Overview of standardized tests

	n	**Percentage**
Standardized Test Type		
Indirect	33	63.46%
Direct	19	36.53%
Format of Test		
Questionnaire/Survey	31	59.61%
Interview	2	5.7%
Direct Observation & Interview	19	36.5%
Indirect Standardized Tests (N = 56)		
Family Literacy Questionnaire	5	8.92%
Home Activities Questionnaire	2	3.57 %
Home Literacy Environment Questionnaire	3	5.35%
Parent Reading Beliefs Inventory	5	8.62%
Reading At Home Questionnaire	3	5.35%
Stony Broom Family Reading Survey	3	5.35%
Other	16	28.57%
Direct Observation Standardized Test		
HOME	19	33.92%
HLE Constructs		
Frequency of child related literacy activities	52	100%
Number of literacy materials in the home	52	100%
Parent reading activities/beliefs	2	3.84%
Psychometric Properties Reported (N = 56)		
Inter-observer agreement (direct observations only)	9	47.3%
Not reported	10	52.63%
Reliability coefficients reported on sample	21	64.0%
Not reported	12	36.0%

**Note.* Studies delivered more than one indirect standardized measure (N = 56).

Spanish was reported as the language of majority in 7 or (21%) of the studies and both English and Spanish were reported as the languages of majority for the sample in 3 or 9% of the studies. Forty-four studies provided information on the SES of the families included in their sample. More than half (61.3%) of the families reported living in low SES environments. Seventeen (38.63%) of the studies included families reporting a

range of medium to high SES environments. Additional characteristics of the families were reported in 44 (84.6 %) of the studies we reviewed. Most often these variables included maternal education and maternal age. Other family variables included the parent's marital status and education level.

The standardized tests characteristics we noted across the studies in this review are summarized in Table 1.8. Authors most often used indirect measures (63.46 %) to evaluate the HLE. Only 36.53 % (n = 19) of the studies we reviewed employed a direct measure of parent and child literacy interactions. Indirect tests were most often (59.61%) delivered to parents in questionnaire or survey format. The direct standardized test identified included both a direct observation and interview. Most often (n = 21) indirect standardized tests developed by authors were used to examine the HLE. Tests listed as "other" did not cite an author for the test.

One standardized test identified in this critical review employed direct observations of parent-child literacy behaviors occurring in the home. The Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984; 2003), was used as the standardized tests in all of the studies that employed direct observations of the HLE. For both the direct and indirect standardized tests used in research, all of them included items regarding the frequency of reading interactions occurring in the home and the number of literacy materials available in the home.

Only 9 of the studies that employed HOME (Caldwell & Bradley, 1984; 2003) as a measure of the HLE reported inter-rater agreements. Of the studies using indirect measures, 37.50% (n = 21) reported reliability coefficients on outcomes of the sample

data. However, 28.57% (n = 16) did not report any psychometric properties for either the standardized test used or study outcomes.

Of the 52 articles identified, 46% (n = 24) were published between 2011 and 2015. As shown in Figure 1.2, only 6 % (*n* = 3) of the articles were published in the 1990's. Articles published from 2000 to 2005 included 21.5 % (*n* = 11) of the identified articles while 27.4% (*n* = 14) were published between 2006 and 2010. Studies conducted on the HLE most often occurred (30.76%) in Early Head Start or Head Start settings closely followed by community settings (26.9%). Ten studies were conducted in pre-kindergarten, 6 were conducted in kindergarten and first grade, and 5 studies did not report the setting. Most authors evaluating the HLE used outcomes obtained from standardized measures as a predictor variable (*n* = 31) in longitudinal or regression analyses. Eleven studies used the HLE outcomes as a factor in a path model while 3 studies used the outcome as a mediator or a moderator variable in a path model. Only 9.61% (*n* = 5) of identified studies examined outcomes on the HLE linked to an early literacy or language intervention provided in school or home settings.

More than half of the studies 51.9% (*n* = 27) reported both language and literacy outcomes for the children being examined. Literacy outcomes were only reported in 14 studies and language outcomes were only reported in 11 studies.

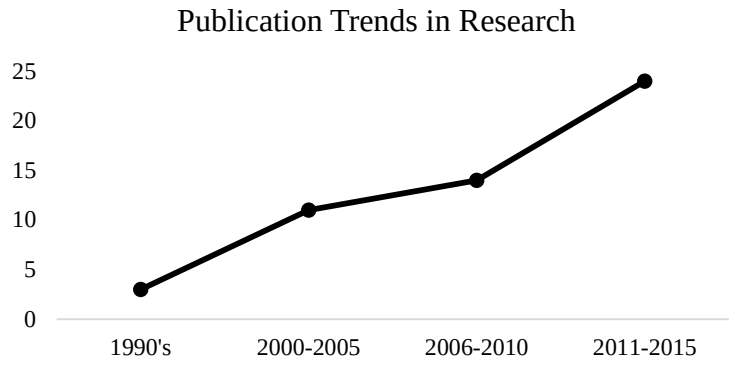

Figure 1.2 Number of publications meeting inclusion criteria from 1990 – 2015.

Across the 52 studies, 80.7% (n = 42) reported significant outcomes related or linked to the HLE. Implications from these studies most often linked the HLE to children's language and literacy achievement at school entry. Many times, the differences noted in children's language and literacy development was linked to parent reports on the HLE, SES, and the mother's education levels.

Discussion

While previous research indicates a positive relationship between family literacy practices in the home and children's later achievement skills, key dimensions of the HLE that have been identified and studied in prior research remain unclear. All of the articles in this review incorporated standardized measures of the HLE, reported an outcome on children's language and/or literacy skills, and was conducted in the United States. Despite evidence promoting the use of HLE measures, significant variability was observed regarding the dimensions and contextual variables prior researchers have used to evaluate the HLE.

Studies of the HLE most often examined parent-reported literacy practices occurring in the homes of young Caucasian children who ranged in age from 3 to 6 years. These studies most often examined the HLE in relation to its impact on children's language and literacy skills at school-entry or longitudinally across time. Parents included in these studies most often reported speaking English and living in low SES environments. Only eleven of the studies examined the HLE of Spanish-speaking families. The small number of studies examining diverse families' HLEs reflects a gap in research in promoting diverse children's literacy development (Baker, 2013; Phillips & Lonigan, 2009; Rodriguez et al., 2009).

Given the impact of cultural differences often reported on the HLE of more diverse families (Davis et al., 2016), it is critical to understand how differences reported by these parents can be used to increase young children's literacy skills (Manz et al., 2010; Mistry, Benner, Biesanz, Clark, & Howes, 2010). While previous research on the HLE provides a great lens into understanding how English-speaking children acquire language and literacy skills in the home, further examinations of minority families HLE practices are warranted. A greater focus in future research should be placed on understanding person-centered differences reported on the HLE and noted in diverse children's language and literacy outcomes. Greater evaluations of cultural and acculturation differences documented in HLE practices of minority families may provide insight into promoting minority children's language and literacy development (Baker, 2013; Phillips & Lonigan, 2009; Rodriguez et al., 2009). Alongside considerations of the populations examined in research, measures used to collect data on the HLE are of

equal importance. Therefore it is necessary to also evaluate the standardized tests and variables most often included in analyses on the HLE.

Sixty-four percent of the studies we reviewed employed indirect standardized measures of the HLE. These assessments were provided to parents in survey or questionnaire formats. Only one direct measure was employed (HOME; Caldwell & Bradley, 1984; 2003). This direct observation measure was used in 19 studies. There were two constructs linked to the HLE that were consistently measured: *the number of literacy materials available in the home* and *the frequency in which parents engaged in reading activities with their children*. The studies employed a range of data analytical procedures. Most often, HLE variables were used as predictor variables on children's language and literacy outcomes. Many of the studies employed longitudinal analyses on data available through national databases that provided item-level or total score outcomes reported by parents on the HLE. A few of the studies examined dimensions related to the HLE by modeling data collected on home literacy practices and children's language and literacy outcomes. Missing in research on the HLE were direct implementation studies to examine independent variables which might improve home literacy practices. Given the variability in factors assessed and analytical models employed to examine the HLE, it is key to evaluate the implications in the use of indirect measures and the lack of consensus on dimensions examined on the HLE.

The majority of studies reviewed employed indirect assessments of the HLE. Indirect measurement practices rely on the parent or caregiver to make relative judgements when answering questions provided through questionnaires or surveys.

Many times, the reliability of the outcomes obtained from indirect measures are evaluated given the threats to the internal validity of the measure (Messick, 1996). Across identified studies reliability coefficients were reported on sample data in 64% or 19 of the studies employing indirect measures. In contrast, only 4 of the studies that employed direct measures reported interrater agreements on the data collected. More direct observations of parents' literacy behaviors should be conducted to evaluate parent-child literacy interactions in the home. Through direct observations, researchers may readily identify key dimensions which validate commonly used indirect measures on the HLE. Future research should examine if the types of reliability coefficients reported on the outcomes of indirect measures align with the use of the data in research. Using item level data to predict outcomes in children's language and literacy abilities may not have been the intended use of the outcomes when the test was developed. Aligning key psychometric properties of tests to the use of the outcomes in research is key to improving measurement of the HLE. In addition to more standardized assessment practices, the measures of the HLE should also be aligned to evaluate key dimensions of the HLE construct.

Many of the variables included in study designs on the HLE were inconsistent across the identified studies. While many studies included items on the number of literacy materials and the frequency of literacy interactions occurring in the home, analyses employed on these variables varied. Additionally, the inclusion of data outcomes on variables related to the context of the HLE were used in analyses in different ways. Consistently, parent reports on SES and mother's educational attainment

were used to explain differences in children's language and literacy outcomes. Without the use of person-centered analyses, key differences reported on these data may be overlooked (Phillips & Lonigan, 2009). The lack of consensus on the variables comprising the HLE construct continues to overshadow the identification of the critical dimensions and contextual variables which comprise the HLE (Baroody & Diamond, 2012; Burgess, Hecht, & Lonigan, 2002; Payne et al., 1994; Phillips & Lonigan, 2009; Roberts et al., 2005).

Outcomes and implications reported in research on the HLE varied across the identified studies. Item level outcomes or partial scores were most often included in analyses to examine the impact of the HLE on children's language and literacy skills. A majority of the studies (80.7%) reported significant outcomes related to data collected on the HLE. While these outcomes seem promising, the use of sound psychometric practices in collecting data on the HLE and its use in analyses is often overlooked. More sound study designs should be considered when employing analyses using data collected on the HLE. Increasing the reports of reliability coefficients on sample data and using the outcomes obtained from standardized tests as intended by the test developer could increase the quality of measurement examining the HLE.

A majority of the studies included data collected from databases through Head Start and community settings. Given the few number of studies (n = 5) which directly measured outcomes on the HLE, it is critical to consider the development of evidence-based early literacy interventions which can educate parents on increasing the quality in the HLE. Since two variables are mainly examined in research on the HLE (e.g.

frequency of literacy interactions and number of literacy materials), this could be as simple as educating parents on more frequently engaging in high quality language and literacy interactions with their children. Directly intervening with families to improve the HLE they provide should be considered.

Conclusions

In this critical review we documented the populations, standardized tests, critical dimensions, and outcomes most often reported in research on the HLE. Most often, the HLE of children ages 3-7 were evaluated to examine its children's literacy and language abilities. Typically, assessments used to measure the HLE were indirect or self-report inventories parents completed. In studies on the HLE, the number of books and the number of times parents read to their children per week were almost always included in the measure outcomes or as a predictor in the analysis on the HLE.. Most often, single items or partial scale scores derived from the indirect measures were used to predict children's literacy skills at entry to school and over time. Significant outcomes were most often reported on variables related to the HLE. However, the lack of consensus on the key components comprising the HLE highlights how the use of different analyses and contextual variables related to the HLE may impact children's language and literacy outcomes in research.

Limitations

Results of the current analyses should be viewed in light of several limitations. First, the exclusion of studies conducted outside of the United States limits the normative samples evaluated in this critical review. Outcomes reported in articles on the

HLE of children in other countries could be compared to the outcomes reported in studies included in this review to identify whether normative differences may have impacted the reported outcomes. Additionally, the outcomes reported in this critical review are descriptive and require further analyses to make implications and generalizations on the current state of HLE practices. Future research should focus on conducting a meta-analysis of these HLE findings to allow for greater interpretations of the outcomes reported in research on the HLE.

Finally, further examinations of studies excluded because they did not report on children's language and literacy examined since these studies often included confirmatory factor analyses or latent class analyses employed on the outcomes of parent reports on the HLE.

CHAPTER IV

SUMMARY

Significant differences in ELL children's literacy trajectories were confirmed by the variability reported in HLE practices among Mexican-American families. Our findings were consistent with previous research documenting differences in Latino children's literacy and language skills at entry to school (Lonigan et al., 2013; Hoff, 2013; Mancilla-Martinez & Lesaux, 2011; Nakamoto et al., 2007; Páez et al., 2007). These findings have important implications for school readiness at entry to school and the variations documented in the literacy strengths and weakness within this homogenous subpopulation. Many times children entering U.S. schools from low SES, minority families are assumed to all demonstrate the same abilities in their literacy development.

The contrasts reported in the three profiles validating the HLE practices among parents are often related to children's school readiness and literacy achievement which may have contributed to the variations documented in children's literacy growth over time (Baker, 2013; Hoff, 2013). While contrary to our hypothesis that children in the LBLP would demonstrate the greatest growth in their literacy skills across time, these findings extend the literature in providing empirical evidence to support the HLE and its contribution to low SES, Mexican-American children's literacy development in prekindergarten to first grade.

While research indicates a positive relationship between family literacy practices in the home and children's later achievement skills, key dimensions of the HLE remain

unclear in research. Despite evidence promoting the use of HLE measures, significant variability exists in the dimensions and contextual variables used to evaluate the HLE. The dimensions, variables, and outcomes reported in research on the HLE were examined through a critical review (n = 52) of identified articles on the HLE. We identified trends reported in research on participant characteristics, standardized tests, critical dimensions, and outcomes most often reported in research on the HLE.

Studies identified on the HLE examined parent reported literacy practices occurring in the homes of young Caucasian children who ranged in age from 3 to 6 years. Most often, the HLEs of young children were examined to evaluate the impact of the HLE on children's language and literacy skills. Indirect assessments were used to measure the HLE through parent self-reported questionnaires or surveys. The number of books and the number of times parents read to their children per week were almost always included on measures and analyses on the HLE. Data collected, were used in various forms when included in analyses. However, the lack of consensus on the key components comprising the HLE highlights the importance of examining how different analyses and contextual variables related to the HLE may impact the outcomes reported on children's language and literacy skills.

Implications of Future Research

Across both studies, the importance of the HLE is highlighted in research. Future research areas should consider further development of a HLE standardized assessment which more readily captures the cultural differences of minority families entering U.S. schools. Additionally, measures of acculturation should be developed and examined

further to identify how families approximate U.S. schooling norms in the HLE they provide to their children. Lastly, continue to develop and provide on-going education to teachers on the differentiated instruction in literacy areas to all children and especially those entering schools from low SES families. Providing teachers with a framework on the HLE and how it can impact children's literacy development could be a catalyst for parents to engage in HLE activities in the home.

In measuring the HLE, a less cumbersome direct measure of the HLE should be developed which adequately captures parent-child literacy interactions occurring in the home. Furthermore, items on the developed assessment should be psychometrically sound to allow for the outcomes used to be included as a predictor variable in analyses on the HLE. By focusing on a more direct, operationally defined measure of the HLE, the critical dimensions which make-up the HLE would begin to emerge through direct observations of parent and child literacy practices occurring in children's homes.

REFERENCES

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, & Joint Committee on Standards for Educational and Psychological Testing. (2014). Standards for educational and psychological testing. Washington, DC: AERA.

Anthony, J. L., Williams, J. M., Zhang, Z., Landry, S. H., & Dunkelberger, M. J. (2014). Experimental evaluation of the value added by Raising a Reader and supplemental parent training in shared reading. *Early Education and Development*, *25*(4), 493-514.

Baker, C. E. (2013). Fathers' and mothers' home literacy involvement and children's cognitive and social emotional development: Implications for family literacy programs. *Applied Developmental Science*, *17*(4), 184-197.

Baker, C. E. (2014a). Mexican mothers' English proficiency and children's school readiness: mediation through home literacy involvement. *Early Education and Development*, *25*(3), 338-355.

Baker, C. E. (2014b). African American fathers' contributions to children's early academic achievement: Evidence from two-parent families from the Early Childhood Longitudinal Study–Birth Cohort. *Early Education & Development*, *25*(1), 19-35.

Baker, C. E., & Iruka, I. U. (2013). Maternal psychological functioning and children's school readiness: The mediating role of home environments for African American children. *Early Childhood Research Quarterly*, *28*(3), 509-519.

Baker, C. E., Cameron, C. E., Rimm-Kaufman, S. E., & Grissmer, D. (2012). Family and sociodemographic predictors of school readiness among African American boys in kindergarten. *Early Education & Development*, *23*(6), 833-854.

Baroody, A. E., & Diamond, K. E. (2012). Links among home literacy environment, literacy interest, and emergent literacy skills in preschoolers at risk for reading difficulties. *Topics in Early Childhood Special Education*, *32*(2), 78-87.

Bennett, K. K., Weigel, D. J., & Martin, S. S. (2002). Children's acquisition of early literacy skills: Examining family contributions. *Early Childhood Research Quarterly*, *17*(3), 295-317.

Boyce, L. K., Gillam, S. L., Innocenti, M. S., Cook, G. A., & Ortiz, E. (2013). An examination of language input and vocabulary development of young Latino dual language learners living in poverty. *First Language*, *33*(6), 572-593.

Boyce, L. K., Innocenti, M. S., Roggman, L. A., Norman, V. K. J., & Ortiz, E. (2010). Telling stories and making books: Evidence for an intervention to help parents in migrant Head Start families support their children's language and literacy. *Early Education and Development*, *21*(3), 343-371.

Bracken, S. S., & Fischel, J. E. (2008). Family reading behavior and early literacy skills in preschool children from low-income backgrounds. *Early Education and Development*, *19*(1), 45-67.

Bradley, R. H., McKelvey, L. M., & Whiteside-Mansell, L. (2011). Does the quality of stimulation and support in the home environment moderate the effect of early education programs?. *Child Development*, *82*(6), 2110-2122.

Britto, P. R., & Brooks-Gunn, J. (2001). Beyond shared book reading: Dimensions of home literacy and low-income African American preschoolers' skills. *New Directions for Child and Adolescent Development*, *2001*(92), 73-90.

Brown, A. (2014). "Hispanic, social and demographic trends." Pew Research Center, Washington, D.C. Retrieved on March 1, 2015: http://www.pewhispanic.org/2011/02/01/unauthorized-immigrant-population-brnational-and-state-trends-2010/.

Burgess, S. (2005). The preschool home literacy environment provided by teenage mothers. *Early Child Development and Care*, *175*(3), 249-258.

Burgess, S. R., Hecht, S. A., & Lonigan, C. J. (2002). Relations of the home literacy environment (HLE) to the development of reading-related abilities: A one-year longitudinal study. *Reading Research Quarterly*, *37*(4), 408-426.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*(2), 81.

Carlson, D., Branum-Martin, L., Durand, A., Barr, C., & Francis, D.J. (2007). Texas reading first initiative summary year four (2006-2007) evaluation report. *Texas Institute for Measurement, Evaluation, and Statistics*, 1-28. University of Houston.

Caspe, M. (2009). Low-income Latino mothers' booksharing styles and children's emergent literacy development. *Early Childhood Research Quarterly*, *24*(3), 306-324.

Castro, D. C., Mendez, J., Garcia, S., Westerber, D. (2012) Family literacy programs for Latino families in the United States. In B. H. Wasik (Ed.), *Handbook of Family Literacy* (pp. 270-288) New York, NY: Routledge.

Chaney, C. (1994). Language development, metalinguistic awareness, and emergent literacy skills of 3-year-old children in relation to social class. *Applied Psycholinguistics*, *15*(03), 371-394.

Coddington, C. H., Mistry, R. S., & Bailey, A. L. (2014). Socioeconomic status and receptive vocabulary development: Replication of the parental investment model with Chilean preschoolers and their families. *Early Childhood Research Quarterly*, *29*(4), 538-549.

Connor, C. M., Son, S. H., Hindman, A. H., & Morrison, F. J. (2005). Teacher qualifications, classroom practices, family characteristics, and preschool experience: Complex effects on first graders' vocabulary and early reading outcomes. *Journal of School Psychology*, *43*(4), 343-375.

Cottone, E. A. (2012). Preschoolers' emergent literacy skills: The mediating role of maternal reading beliefs. *Early Education & Development*, 23(3), 351-372.

Davis, H. S., Gonzalez, J. E., Pollard-Durodola, S., Saenz, L. M., Soares, D. A., Resendez, N., Zhu, L., Hagan-Burke, S. (2016). Home literacy beliefs and practices among low income Latino families. *Early Child Development and Care*, 186, 1152-1172. ISSN: 0300-4430

DeBaryshe, B. D., & Binder, J. C. (1994). Development of an instrument for measuring parental beliefs about reading aloud to young children. *Perceptual and Motor Skills*, *78*(3c), 1303-1311.

Dever, M., & Burts, D. (2002). An evaluation of family literacy bags as a vehicle for parent involvement. *Early Child Development and Care*, *172*(4), 359-370.

Dunn, D. M., & Dunn, L. M. (2007). *Peabody picture vocabulary test: Manual*. Pearson.

Edwards, C. M. (2012). Maternal literacy practices and toddlers' emergent literacy skills. *Journal of Early Childhood Literacy*, DOI: 1468798412451590.

Farver, J. A. M., Xu, Y., Eppe, S., & Lonigan, C. J. (2006). Home environments and young Latino children's school readiness. *Early Childhood Research Quarterly*, *21*(2), 196-212.

Farver, J.A.M., Xu, Y., Lonigan, C. J., & Eppe, S. (2013). The home environment and Latino Head Start children's emergent literacy skills. *Developmental Psychology*, *49* (4) 775-791. doi:10.1037/a0028766

Fiske, D. W. (1987). Construct invalidity comes from method effects. *Educational and Psychological Measurement*, *47*(2), 285-307.

Foster, M. A., Lambert, R., Abbott-Shim, M., McCarty, F., & Franze, S. (2005). A model of home learning environment and social risk factors in relation to children's emergent literacy and social outcomes. *Early Childhood Research Quarterly*, *20*(1), 13-36.

Froiland, J. M., Powell, D. R., & Diamond, K. E. (2014). Relations among neighborhood social networks, home literacy environments, and children's expressive

vocabulary in suburban at-risk families. *School Psychology International*, *35*(4), 429-444.

Froyen, L. C., Skibbe, L. E., Bowles, R. P., Blow, A. J., & Gerde, H. K. (2013). Marital satisfaction, family emotional expressiveness, home learning environments, and children's emergent literacy. *Journal of Marriage and Family*, *75*(1), 42-55.

Haak, J., Downer, J., & Reeve, R. (2012). Home literacy exposure and early language and literacy skills in children who struggle with behavior and attention problems. *Early Education & Development*, *23*(5), 728-747.

Hammer, C. S., & Miccio, A. W. (2006). Early language and reading development of bilingual preschoolers from low-income families. *Topics in Language Disorders, 26*, 322–337.

Hammer, C. S., Farkas, G., & Maczuga, S. (2010). The language and literacy development of Head Start children: A study using the Family and Child Experiences Survey database. *Language, Speech, and Hearing Services in Schools*, *41*(1), 70-83.

Hammer, C. S., Jia, G., & Uchikoshi, Y. (2011). Language and literacy development of dual language learners growing up in the United States: A call for research. *Child Development Perspectives*, *5*(1), 4-9.

Hammer, C. S., Miccio, A. W., & Wagstaff, D. A. (2003). Home literacy experiences and their relationship to bilingual preschoolers' developing English literacy abilities: An initial investigation. *Language, Speech, and Hearing Services in Schools*, *34*(1), 20-30.

Hart, S. A., Petrill, S. A., DeThorne, L. S., Deater-Deckard, K., Thompson, L. A., Schatschneider, C., & Cutting, L. E. (2009). Environmental influences on the longitudinal covariance of expressive vocabulary: measuring the home literacy environment in a genetically sensitive design. *Journal of Child Psychology and Psychiatry*, *50*(8), 911-919.

Hart, B., & Risley, T. (1995). *Meaningful differences in everyday parenting and intellectual development in young American children*. Baltimore: Brookes.

Hoff, E. (2013). Interpreting the early language trajectories of children from low-SES and language minority homes: implications for closing achievement gaps. *Developmental Psychology*, *49*(1), 4.

Honig, B., Diamond, L., Gutlohn, L., & Cole, C. L. (2013). *Teaching reading sourcebook, Second Edition*. Washington, DC: Arena Press.

Hood, M., Conlon, E., & Andrews, G. (2008). Preschool home literacy practices and children's literacy development: A longitudinal analysis. *Journal of Educational Psychology*, *100*(2), 252.

Johnson, A. D., Martin, A., Brooks-Gunn, J., & Petrill, S. A. (2008). Order in the house! Associations among household chaos, the home literacy environment, maternal reading ability, and children's early reading. *Merrill-Palmer Quarterly (Wayne State University. Press)*, *54*(4), 445.

Jordan, G. E., Snow, C. E., & Porche, M. V. (2000). Project EASE: The effect of a family literacy project on kindergarten students' early literacy skills. *Reading Research Quarterly*, *35*(4), 524-546.

Landry, S. H., Assel, M. A., Gunnewig, S. B., & Swank, P. R. (2005). mCLASS: C.I.R.C.L.E. Houston, TX: CIRCLE Group.

Lewis, K., Sandilos, L. E., Hammer, C. S., Sawyer, B. E., & Méndez, L. I. (2015). Relations among the home language and literacy environment and children's language abilities: A study of Head Start dual language learners and their mothers. *Early Education and Development*, 1-17.

Linan-Thompson, S., Bryant, D. P., Dickson, S. V., & Kouzekanani, K. (2005). Spanish literacy instruction for at-risk kindergarten students. *Remedial and Special Education*, *26*(4), 236-244.

Lonigan, C. J. (2006). Development, assessment, and promotion of pre literacy skills. *Early Education and Development*, *17*(1), 91-114.

Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: evidence from a latent-variable longitudinal study. *Developmental Psychology*, *36*(5), 596.

Lonigan, C. J., Farver, J. M., Nakamoto, J., & Eppe, S. (2013). Developmental trajectories of preschool early literacy skills: A comparison of language-minority and monolingual-English children. *Developmental Psychology, 49*(10), 1943.

López L. M. & Greenfield, D. B. (2004). The cross-language transfer of phonological skills in Hispanic Head Start children. *Bilingual Research Journal*. 28(1).

Mancilla-Martinez, J., & Lesaux, N. K. (2011). The gap between Spanish speakers' word reading and word knowledge: A longitudinal study. *Child Development*, *82*(5), 1544-1560.

Manz, P. H., Hughes, C., Barnabas, E., Bracaliello, C., & Ginsburg-Block, M. (2010). A descriptive review and meta-analysis of family-based emergent literacy interventions: To what extent is the research applicable to low-income, ethnic-minority or linguistically-diverse young children?. *Early Childhood Research Quarterly*, *25*(4), 409-431.

Marcella, J., Howes, C., & Fuligni, A. S. (2014). Exploring cumulative risk and family literacy practices in low-income Latino families. *Early Education & Development*, *25*(1), 36-55.

McGrath, Lauren M., Bruce F. Pennington, Erik G. Willcutt, Richard Boada, Lawrence D. Shriberg, and Shelley D. Smith. (2007) Gene× environment interactions in speech sound disorder predict language and preliteracy outcomes. *Development and Psychopathology*, 19(4), 1047-1072.

Messick, S. (1996). Validity and washback in language testing. *ETS Research Report Series*, 1996(1), i-18.

Metsala, J.L., & Walley, A.C. (1998). Spoken vocabulary growth and the segmental restructuring of lexical representations: Precursors to phonemic awareness and early reading ability. In J.L. Metsala & L.C. Ehri (Eds.), Word recognition in beginning literacy (pp. 89– 120). Hillsdale, NJ: Erlbaum.

Mistry, R. S., Benner, A. D., Biesanz, J. C., Clark, S. L., & Howes, C. (2010). Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly*, *25*(4), 432-449.

Mol, S. E., & Neuman, S. B. (2014). Sharing information books with kindergartners: The role of parents' extra-textual talk and socioeconomic status. *Early Childhood Research Quarterly*, 29(4), 399-410.

Muthén, L. K., & Muthén, B. O. (1998-2015). *Mplus User's Guide 7th ed.*. Los Angeles, CA: Muthén & Muthén.

Nakamoto, J., Lindsey, K. A., & Manis, F. R. (2007). A longitudinal analysis of English language learners' word decoding and reading comprehension. *Reading and Writing*, *20*(7), 691-719.

National Early Literacy Panel. (2008). *Developing early literacy: Report of the National Early Literacy Panel.* Washington, DC: National Institute for Literacy.

National Institute of Child Health & Human Development. (2000). Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. (NIH Publication No. 00-4769). Washington, DC: U. S. Government Printing Office.

Páez, M. M., Tabors, P. O., & López, L. M. (2007). Dual language and literacy development of Spanish-speaking preschool children. *Journal of Applied Developmental Psychology*, *28*(2), 85-102.

Payne, A. C., Whitehurst, G. J., & Angell, A. L. (1994). The role of home literacy environment in the development of language ability in preschool children from low-income families. *Early Childhood Research Quarterly*, *9*(3), 427-440.

Phillips, B. M., & Lonigan, C. J. (2009). Variations in the home literacy environment of preschool children: A profile analytic approach. *Scientific Studies of Reading*, *13*(2), 146-174.

Reese, L., & Goldenberg, C. (2008). Community literacy resources and home literacy practices among immigrant Latino families. *Marriage & Family Review*, *43*(1-2), 109-139.

Reese, L., Garnier, H., Gallimore, R., & Goldenberg, C. (2000). Longitudinal analysis of the antecedents of emergent Spanish literacy and middle-school English reading achievement of Spanish-speaking students. *American Educational Research Journal*, *37*(3), 633-662.

Raikes, H., Green, B. L., Atwater, J., Kisker, E., Constantine, J., & Chazan-Cohen, R. (2006). Involvement in Early Head Start home visiting services: Demographic predictors and relations to child and parent outcomes. *Early Childhood Research Quarterly*, *21*(1), 2-24.

Ricci, L. (2011). Home literacy environments, interest in reading and emergent literacy skills of children with Down syndrome versus typical children. *Journal of Intellectual Disability Research*, *55*(6), 596-609.

Roberts, J., Jergens, J., & Burchinal, M. (2005). The role of home literacy practices in preschool children's language and emergent literacy skills. *Journal of Speech, Language, and Hearing Research*, *48*(2), 345-359.

Rodriguez, E. T., & Tamis-LeMonda, C. S. (2011). Trajectories of the home learning environment across the first 5 years: Associations with children's vocabulary and literacy skills at prekindergarten. *Child Development*, *82*(4), 1058-1075.

Rodriguez, E. T., Tamis-LeMonda, C. S., Spellmann, M. E., Pan, B. A., Raikes, H., Lugo-Gil, J., & Luze, G. (2009). The formative role of home literacy experiences across the first three years of life in children from low-income families. *Journal of Applied Developmental Psychology*, *30*(6), 677-694.

Sawyer, B. E., Justice, L. M., Guo, Y., Logan, J. A., Petrill, S. A., Glenn-Applegate, K., ... & Pentimonti, J. M. (2014). Relations among home literacy environment, child characteristics and print knowledge for preschool children with language impairment. *Journal of Research in Reading*, *37*(1), 65-83.

Scarborough, H. S., Dobrich, W., & Hager, M. (1991). Preschool literacy experience and later reading achievement. *Journal of learning Disabilities*, *24*(8), 508-511.

Sénéchal, M., & Lefevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child development*, *73*(2), 445-460.

Skibbe, L. E., Justice, L. M., Zucker, T. A., & McGinty, A. S. (2008). Relations among maternal literacy beliefs, home literacy practices, and the emergent literacy skills of preschoolers with specific language impairment. *Early Education and Development*, *19*(1), 68-88.

Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Speece, D. L., Ritchey, K. D., Cooper, D. H., Roth, F. P., & Schatschneider, C. (2004). Growth in early reading skills from kindergarten to third grade. *Contemporary Educational Psychology*, *29*(3), 312-332.

Statistics (2013). The Nation's Report Card: A First Look: 2013 Mathematics and Reading (NCES 2014-451).Institute of Education Sciences, U.S. Department of Education, Washington, D.C.

Stephenson, K. A., Parrila, R. K., Georgiou, G. K., & Kirby, J. R. (2008). Effects of home literacy, parents' beliefs, and children's task-focused behavior on emergent literacy and word reading skills. *Scientific Studies of Reading*, *12*(1), 24-50.

Suen, H. K., & Ary, D. (1989). Analyzing quantitative observation data. Hillsdale, NJ: Lawrence Erlbaum.

Taylor, R. (1996). *The Familia Inventory User's Manual***.** Family Reading Resources, Grandview, MO.

Ullery, M. A., Dinehart, L., & Katz, L. (2014). The Effect of a Supplemental Book-Sharing Intervention for Developmentally Delayed Toddlers Who Were Prenatally Exposed to Cocaine. *Journal of Developmental and Physical Disabilities*, *26*(1), 93-113.

Weigel, D. J., Martin, S. S., & Bennett, K. K. (2005). Ecological influences of the home and the child-care center on preschool-age children's literacy development. *Reading Research Quarterly*, *40*(2), 204-233.

Weigel, D. J., Martin, S. S., & Bennett, K. K. (2006). Mothers' literacy beliefs: Connections with the home literacy environment and pre-school children's literacy development. *Journal of Early Childhood Literacy*, *6*(2), 191-211.

Weigel, D. J., Martin, S. S., & Bennett, K. K. (2010). Pathways to literacy: Connections between family assets and preschool children's emergent literacy skills. *Journal of Early Childhood Research*, *8*(1), 5-22.

Whaley, S. E., Jiang, L., Gomez, J., & Jenks, E. (2011). Literacy promotion for families participating in the Women, Infants and Children program. *Pediatrics*, *127*(3), 454-461.

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child development*, *69*(3), 848-872.

Yuan, K. H., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological methodology*, *30*(1), 165-200.

Zaslow, M. J., Weinfield, N. S., Gallagher, M., Hair, E. C., Ogawa, J. R., Egeland, B., ... & De Temple, J. M. (2006). Longitudinal prediction of child outcomes from differing measures of parenting in a low-income sample. *Developmental psychology*, *42*(1), 27.